STEEL

The

Metalworking Weekly

OCTOBER 31, 1960

A PENTON PUBLICATION

Men, Not Assets, Are Key to Growth

"I get excited over men, abilities, and talent—not assets," says Cook Electric Co.'s president, Walter C. Hasselhorn. That philosophy, coupled with strong emphasis on contract research and development, has proved to be the right formula for the Chicago firm's rapid growth. R&D is contributing about 25 per cent of the firm's total sales and has led to the formation of several new product divisions. See Page 40.

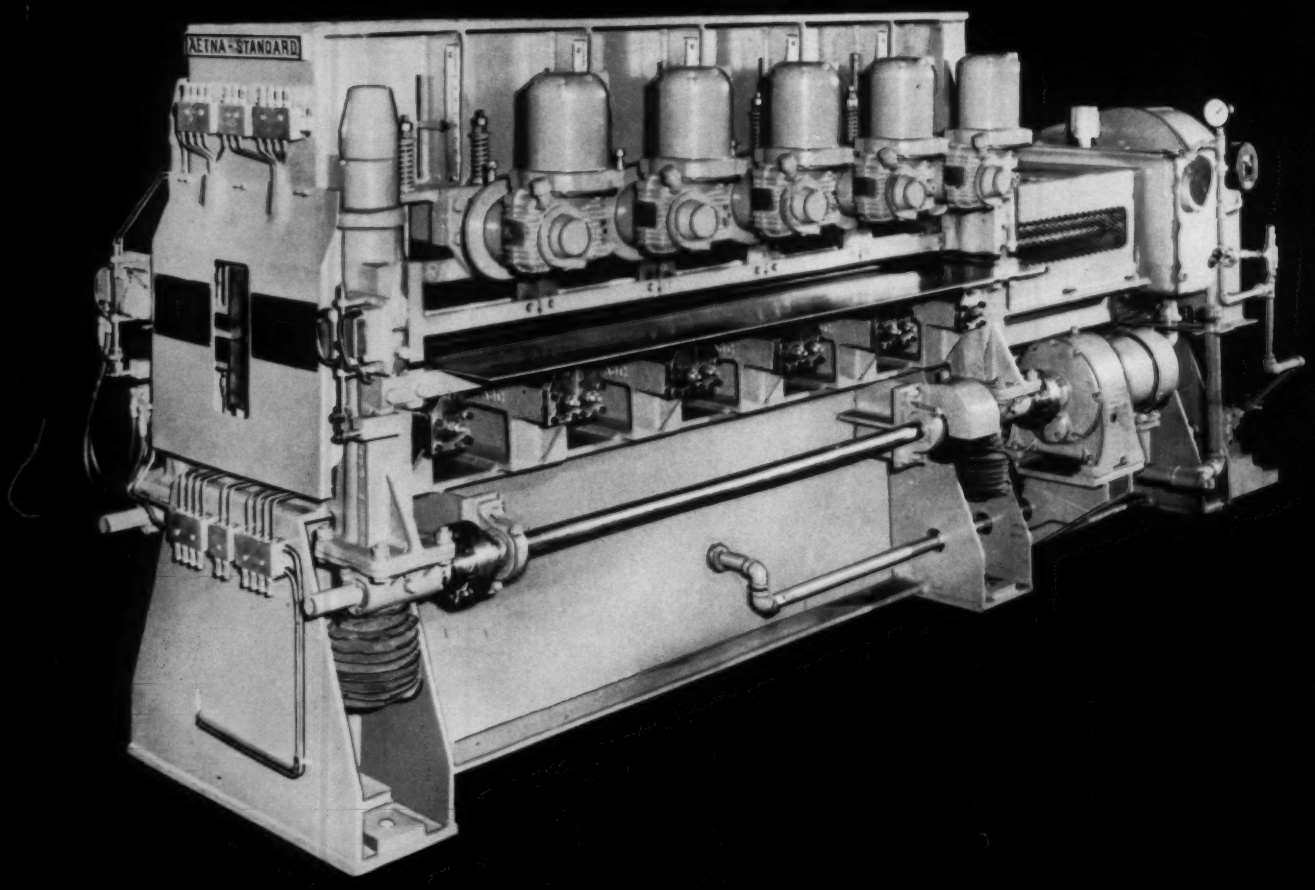
Despite Gloom Talk, Metalworking Sales Head for Record $146 Billion

'Hot Cold Working' Improves Hardness of High Speed Steels

Power Programing Cuts Costs, Does Better Job in Belt Grinding

Western States Take More Steel

CONTENTS—TURN PAGE



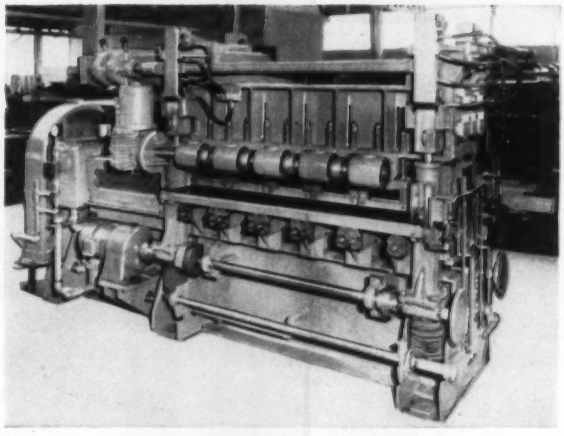
MORE WORK ON PRODUCT MADE POSSIBLE

WITH THIS

NEW ROLLER LEVELER

This new Roller Leveler, designed and manufactured by the Aetna-Standard Division of Blaw-Knox, has individual motor-operated back-up roll adjustments. The operator can easily make quick correction of product shape. The additional sets of back-up rolls make possible more flexibility of adjustment and more thorough working of the product. Motorized adjustments are also included for gauge thickness which make the unit fully equipped with power adjustments.

Leveler illustrated is 1¾" dia. x 72" face—21 rolls. Other sizes can be furnished to suit individual requirements. For detailed information on this new Roller Leveler or other Sheet and Strip Equipment, write: Aetna-Standard Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.



AETNA-STANDARD MAKES MANY TYPES OF LEVELERS

These include 2 and 4 high Roller Levelers, Rectifier Levelers, Heavy Plate Levelers, Roller Levelers for tapered sheets.

Aetna-Standard Division

BLAW-KNOX

This Week in STEEL

The Metalworking Weekly

October 31, 1960 Vol. 147 No. 18

Metalworking Sales Head for Record This Year

A record $146 billion in sales is shaping up for metalworking this year, despite a sharp business drop in the steel industry. A 1.1 per cent increase over last year is stemming from a high level of business in all of metalworking in the first quarter and continued strength in the metal consuming industries. PAGE 29

$146.0 billion in 1960

$144.4 billion in 1959

$122.3 billion in 1958

Cold Rolling Shapes a Better Disc

Stronger, faster, cheaper, and more reliable. That's what GE says of the discs for superjet engines made by a cold rolling technique developed by its Flight Propulsion Div. It says they compare favorably in high speed, destructive tests with those made by older methods. In superjet engine compressors, the discs run at 7450 rpm (plus a 12 per cent overspeed). A finished, cold rolled disc was fitted with blades (see photo) for testing. Speed registered 11,854 rpm at failure. PAGE 64

Treatment Ups Hardness of High Speed Steel

If you're looking for a way to produce higher hardnesses in high speed steel, a process often called "hot cold working" may do the job for you. Tests on M-2 steel show an increase of several Rockwell C points. One benefit cited: Longer life for cutting tools, which might lower manufacturing costs. PAGE 66

New Technique Aids Belt Grinding

Increasing power at a predetermined rate as an abrasive belt dulls or becomes worn can extend belt life. In a test on titanium sheets, "power programing" gave the belt a useful life of 93 passes (vs. an estimated 44 by conventional techniques). For other advantages, see PAGE 70

West's Steel Take Rises in First Half

Steel receipts in seven Western states in the first half of 1960 averaged 20 per cent higher than in the 1959 period, a Kaiser Steel Corp. study shows. Since midyear, purchases from mills have dropped substantially due to inventory reductions. However, consumption is down only moderately. Construction, principal use of steel in the area, is relatively strong. PAGE 89

COMPLETE CONTENTS ▶

CONTENTS

Metalworking Week, Page 19

The Editor's Views—'61: Time for Hard Sell 25
Metalworking Sales Head for Record This Year: $146 Billion 29
Electrical Companies Win on Cost of Living Issue 31
How to Buy Abroad—Tips from a purchasing agent 32
Pressmakers Push for Higher Sales—They stress new features 34
Electroshaping May Ease Machining of Tough Metals 35
Luxembourg: Small but Mighty—It has become industrial giant ... 39
People Are Your Biggest Asset for Growth, Says Cook Electric 40
Japan Needs, Wants U. S. Tools—Potential market tremendous ... 42
Government Guarantees Power for Steel Plant at Anaconda, Mont. 58

Technical Outlook, Page 63

Cold Rolling Shapes a Better Disc—Withstands high speeds 64
Treatment Ups Hardness of High Speed Steel—"Hot cold working" 66
Quick, Simple Test Solves Quality Control Problem—Spots leaks .. 67
Four Ways Studwelding Pays Off—Imaginative applications 68
New Technique Aids Belt Grinding—It's called "power programing" 70
Progress in Steelmaking—Marginal Ores Upgraded by Magnetizing Roasting—Western Mesabi range gets pilot plants 72
Hot Gases from Electrics Cleaned with Glass Bags—Used in West 74
Tubemaker Markets Precisely Contoured IDs—Product cold rolled 76
Manual Spotwelders Fasten Wind Tunnel Lining—Method cuts costs 78

Market Outlook, Page 87

Complete Index to Market News and Prices 87
West's Steel Take Rises in First Half—Up 20 per cent from '59 ... 89
Chicago's Steel Imports Down 6 Per Cent in September 90
Steelworks Operation Chart and District Ingot Rates 92
Scrap Resists Further Decline—Composite stands at $30.17 103
Nonferrous Metals—Higher Brass Prices in Effect This Week 106
Canadian Iron and Steel Production Tends Upward 110

WHERE TO FIND

Servicenter 5
Calendar of Meetings 10
Editorial & Business Staffs 16
Metalworking Pulse 22
Windows of Washington . 36
Mirrors of Motordom 45
The Business Trend 49
Men of Industry 53
Obituaries 56
New Products 81
New Literature 85
Advertising Index 111

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KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many who may find it useful to review fundamentals from time to time.

Determining the Depth-Hardness of Alloy Steels

The hardenability of an alloy steel is usually measured by the depth to which the steel will harden under specific conditions of heating and cooling. One of the most conclusive methods of determining depth hardness is the end-quench hardenability test (ASTM A255). In essence, this test is as follows:

A 1-in. round specimen, approximately 4 in. long, is heated uniformly to the proper quenching temperature. The specimen is removed from the furnace and placed in a bracket; then a jet of water at room temperature is played on the bottom face of the specimen without touching the sides. This water jet is kept active until the entire specimen has cooled. Longitudinal flat areas are ground on opposite sides of the piece, and Rockwell C readings are taken at 1/16-in. intervals. The resulting data are plotted on graph paper, with the Rockwell C values as ordinates and distances from the quenched end as abscissae.

Experiments have shown that the points on the hardenability curve approximate the cooling rates at the centers of quenched rounds of various sizes; and that the hardness values at the centers of these rounds will correspond very closely with those shown at points on the end-quench hardenability curve.

In general it may be said that when end-quench curves for different steels approximately coincide, these steels can be treated similarly for equivalent tensile properties in sections of the same size.

A study of hardenability curves reveals that depth-hardness depends upon the amount of carbon present, the alloy content, and the grain size. Manganese, chromium, and molybdenum are the chief elements that promote depth-hardness, while nickel and silicon help to a lesser degree. It should be noted, also, that phosphorus promotes depth-hardness, while sulphur has a negative effect. In normal low-phosphorus and low-sulphur steels, the two elements neutralize each other.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation

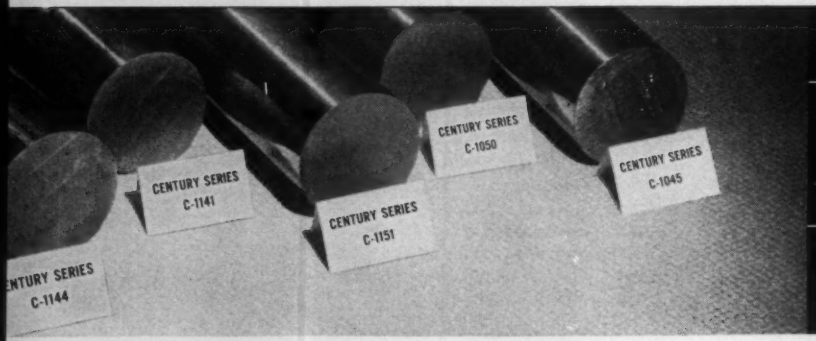
BETHLEHEM STEEL

problem-solving products and services

from Republic Steel

ELECTRO PAINTLOK® STEEL SHEETS. For production of their top line shower cabinets, Vogt Brothers Mfg. Company, Louisville, Ky, needed sheets that would take and hold paint exceptionally well, because the units are subjected to soap, hot and cold water, bumps and knocks. The solution: Republic Electro Paintlok Steel Sheets. Paintlok sheets are zinc coated electrolytically, then chemically treated to provide an inert phosphate surface film. Result: a firm mechanical bonding of paint, lacquer, or enamel to steel. In die forming, brake forming, and piercing operations, Vogt found that Paintlok is easy to fabricate, too.

If getting a good, tight painted finish is your problem, it will pay you to investigate Republic Electro Paintlok. Mail coupon for data.



GRADE	ANALYSIS EXTRA	BEST COMBINATION OF STRENGTH & TOUGHNESS	MACHINABILITY
C-1144	$1.35		
C-1141	1.10		
C-1151	.70		
C-1050	.15		
C-1045	.15		

CENTURY SERIES COLD FINISHED STEEL BARS. Having trouble finding cold finished bar stock with the right balance of machinability and toughness? Republic's CENTURY SERIES was made to solve this problem. CENTURY SERIES offers five different grades of high strength, stress-relieved, cold finished bars, each having a minimum yield strength of 100,000 psi. Selecting the grade with just the degree of machinability and toughness you need can mean reduced savings in material costs. For production of highly machined parts, C-1144 is the right choice. For moderately machined parts—C-1141 or C-1151. If machinability is a minor factor, C-1050 or C-1045 would be the best, most economical choice. Smooth, scale-free surfaces require no finishing operations for many applications. Send for free CENTURY SERIES booklet.

STAINLESS STEEL. When a difficult stainless forming problem confronted Applied Arts, Inc., Grand Rapids, Michigan, automotive trim manufacturer, fast action from Republic saved time and money. Problem occurred with a piece of window trim for a 1960 car, where a particularly severe draw was causing a bad roping surface. Applied Arts called on Republic Metallurgists, who studied the forming operations and recommended a specification change to vary the physicals of the stainless slightly. The result: roping was eliminated and the rejection rate dropped well below original estimate.

Republic Stainless Metallurgists are at your service, where and when you need them—to help you select, apply, and process the stainless steel best suited to your requirements. Send for complete information.

VACUUM-MELTED METALS—carbon, alloy, stainless, and titanium—are available from Republic in plates, billets, bars, sheets, strip, and wire. With the most extensive vacuum-melting facilities ever assembled, Republic is producing ingots weighing from 4,000 to 20,000 pounds, in 18- to 32-inch diameters. Mail the coupon for complete information.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. ST-9835A
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Please send free CENTURY SERIES Booklet
Send more information on:
☐ Electro Paintlok Steel Sheets
☐ Stainless Steel
☐ Vacuum-Melted Metals

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

EC-1357 cuts costs, makes possible stronger sandwich panels

LABORATORY TESTS show EC-1357 provides the high strength and rigidity called for in nonload-bearing sandwich structures.

3M Adhesive EC-1357 bonds all kinds of skin and core materials *without heat*. You'll speed production, cut costs, build in high strength for non-load-bearing sandwich panels.

You can force-dry the solvent out of the adhesive prior to bonding. And a nip roller or cold press is all that is required to complete the bond.

EC-1357 provides maximum immediate strength. And the bond continues to strengthen as it cures at room temperatures.

Dark in color, EC-1357 absorbs infrared heat quickly, dries fast; so no production delay is necessary. And it sprays on with minimum cobwebbing, thus saving materials.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU: Consult 3M Research. Contact your 3M Field Engineer. Or, for information and free literature, write: A.C.&S. Division, 3M, Dept. SBEE - 100, St. Paul 6, Minnesota.

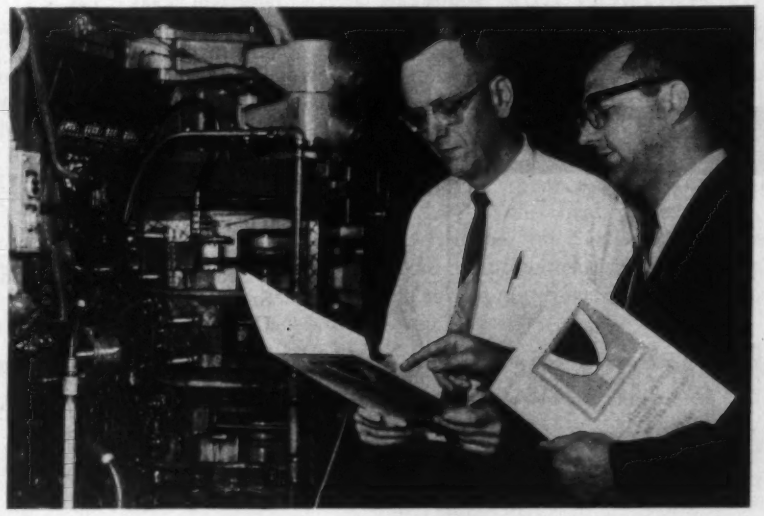
ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

August Usership Winner Scores with Second Entry



Sticktoitiveness paid off for A. L. Lauer (right), director of education and training, Saginaw Steering Gear Div. (Saginaw, Mich.) of General Motors Corp. Mr. Lauer picked up an honorable mention award in our June Usership Idea of the Month contest. Then he sent along an entry in our August contest that took the top award of $500, a commemorative plaque, and earned him the title of Honorary Editor No. 10. In his second effort, Mr. Lauer cited an article and the Materials Efficiency series as helpful on his job.

Here's His Entry

"The article, 'GE Offers Machining Profit Finder,' in the Aug. 8, 1960, issue of STEEL, promises to be of great value to this organization. I showed the article to our director of work standards (Philip S. Lang, shown to the left in the photo). He found several ideas for innovations in and comparisons to our system of determining machining profitability. Mahar Tool Supply Co., Saginaw, is providing us with GE's, 8 hour orientation program, slides, and other materials. They also gave us a folder, 'Better Profits through Better Tooling with Hi-E (high efficiency) Machining,' as well as Hi-E Work Sheets that we compared with our present method and procedure.

"Since we are working on an Advanced Methods Engineering Training Program, this material will be implemented in it to some extent. The entire 8 hour orientation will also be used in training our new work standards engineers.

"The Materials Efficiency articles are also valuable to us in preparation of the Advanced Methods Training Program. The articles are excellent source and reference material. They will be used in a Material Utilization Program conducted by our Purchasing Dept. . ."

Honorable Mention Awards . . .

. . . went to seven entrants, and two of them won with a jointly created entry. The collaborators: J. A. Dalpiaz, chief metallurgist, and L. A. Ward, chief tool designer, Textile Machinery Div. of Saco-Lowell Shops, Easley, S.C.

The others, in A, B, C order, were: Clifford C. Ayers, director of personnel, Welding Div., Lewis Welding & Engineering Corp., Bedford, Ohio; Glenn A. Johnson, chief plant engineer, Inland Steel Products Co., Milwaukee; Howard H. Peterson, purchasing agent, Anaconda Wire & Cable Co., Muskegon, Mich.; Eugene J. Tasse, research engineer, Pascoe Steel Corp., Pomona, Calif.; R. D. Veitel, production engineer, Bruner Corp., a division of Hagan Chemicals & Controls Inc., Milwaukee.

All of the honorable mention winners were awarded handsome desk lighters as permanent records of their achievements.

You Can Win $1000 This Month

There are five issues of STEEL this month—and one could help you win $1000 in our Usership Idea of the Month Contest.

Tell us, in 300 words or less, how you plan to USE an article or advertisement in this

COMING

Nov. 7 in

STEEL

How to Slash Scrap Costs

You can do it when you:

1. REDUCE SCRAP GENERATION
2. CONVERT SCRAP TO OTHER USES
3. UPGRADE SCRAP QUALITY
4. MAKE IN-PLANT HANDLING OF SCRAP MORE EFFICIENT

Next week's installment in STEEL's Materials Efficiency series will give chapter and verse on those four points. It will also tell how to set up a salvage program so that metalworking can reclaim more of its scrap which currently amounts to 20 per cent of all material purchased.

issue (or any other issue published this month—October, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . You will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared top winner of STEEL's Usership Idea of the Month Award.

You may enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

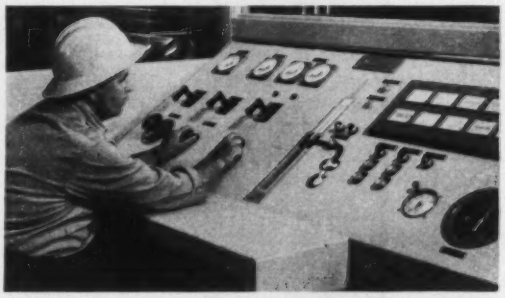
Send entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. **Deadline for this month's contest is Dec. 1.**

Proceed with Caution

On a tour of an Eastern blast furnace, one of our editors noticed people were chuckling while gingerly skirting a building. As he drew closer to the scene, the cautious detours were explained by the inelegant but effective message on a home-made sign:

"STOP! LIKE US CATS IS WORKING WAY UP ON THE ROOF, MAN."

(Safety directors, please note.)



Progress in Vacuum Steelmaking

It's a long stride from the crude apparatus used in early crucible steelmaking (once the leader in production of finest steels), to the modern process operator's console (above). In the nerve center for today's vacuum remelt furnace, the operator sits comfortably in a glass enclosed, air conditioned booth. He relies on his brain, rather than brawn, to produce the premium purity steels used in the era of space probes and atomic energy.

For next week's issue, Associate Editor Neil Roberts has prepared a two-part cover story that will show you where vacuum processes are going in this decade. To round out the story, he'll also describe a modern, consumable electrode facility that turns out high grade ingots at Standard Steel Works Div. (Burnham, Pa.), Baldwin-Lima-Hamilton Corp. (Incidentally, the only crucible furnace reported operating in the U. S. is also at the Burnham plant.)

...Fluid Power news

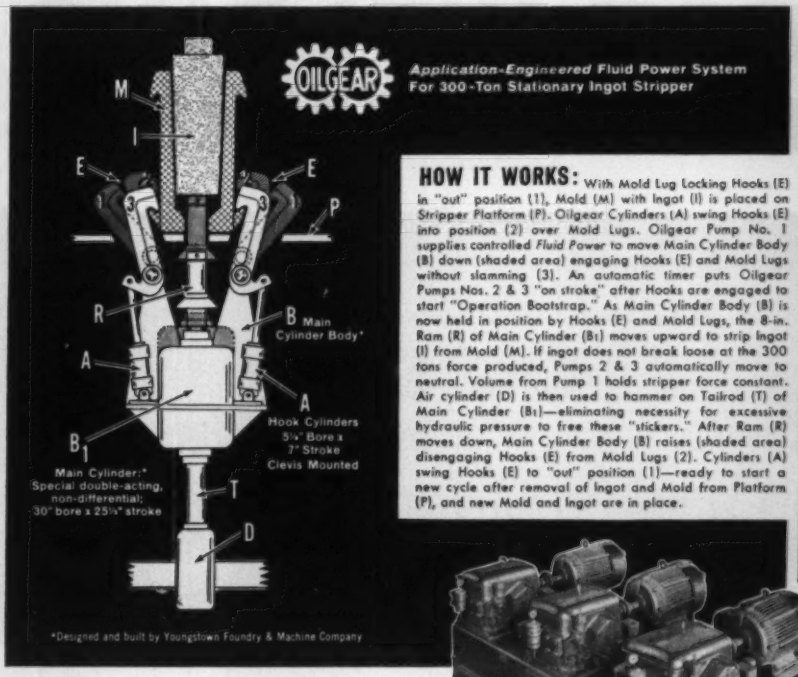
REPORT NO. 11,804 OILGEAR POWERED INGOT STRIPPER

From Oilgear *Application-Engineering* Files

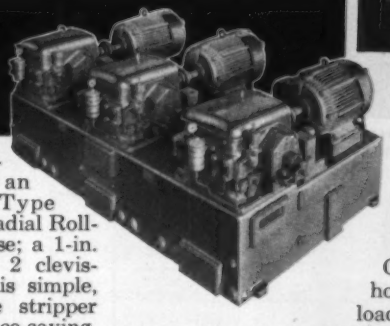
HOW OILGEAR HEAVY-DUTY SYSTEM SIMPLIFIES POWER AND CONTROL OF 300-TON STATIONARY INGOT STRIPPER—HELPS ELIMINATE MAINTENANCE DOWNTIME

DATA: To replace a mechanical-type ingot stripper because of considerable maintenance downtime caused by dirt and foreign particles jamming the motor-driven ram screw—necessitating disassembly of the entire mechanism to free the threads. A hydraulically-powered, floor-mounted stripper design was approved as most convenient for the big-end-up molds used in this particular operation—would provide faster, easier maintenance accessibility at lowest over-all initial replacement cost.

Basic Power and Control Requirements: 1. Simplicity, and trouble-free, rugged dependability. 2. To be capable of many years of heavy-duty, rapid, 'round-the-clock operation with an absolute minimum of maintenance. 3. Must be: impervious to sand, scale, heat; compact; thrifty on electrical power input, wiring, installation downtime, floor space; completely free, if possible, from maintenance-provoking belts, chains, relays. 4. One source and responsibility for power and control systems preferred.



HOW IT WORKS: With Mold Lug Locking Hooks (E) in "out" position (1), Mold (M) with Ingot (I) is placed on Stripper Platform (P). Oilgear Cylinders (A) swing Hooks (E) into position (2) over Mold Lugs. Oilgear Pump No. 1 supplies controlled *Fluid Power* to move Main Cylinder Body (B) down (shaded area) engaging Hooks (E) and Mold Lugs without slamming (3). An automatic timer puts Oilgear Pumps Nos. 2 & 3 "on stroke" after Hooks are engaged to start "Operation Bootstrap." As Main Cylinder Body (B) is now held in position by Hooks (E) and Mold Lugs, the 8-in. Ram (R) of Main Cylinder (B_1) moves upward to strip Ingot (I) from Mold (M). If ingot does not break loose at the 300 tons force produced, Pumps 2 & 3 automatically move to neutral. Volume from Pump 1 holds stripper force constant. Air cylinder (D) is then used to hammer on Tailrod (T) of Main Cylinder (B_1)—eliminating necessity for excessive hydraulic pressure to free these "stickers." After Ram (R) moves down, Main Cylinder Body (B) raises (shaded area) disengaging Hooks (E) from Mold Lugs (2). Cylinders (A) swing Hooks (E) to "out" position (1)—ready to start a new cycle after removal of Ingot and Mold from Platform (P), and new Mold and Ingot are in place.



ABOVE: Oilgear-equipped Ingot Stripper "in action"—Mold Lug Locking Hooks (E) indicated. A 10,000-lb. ingot has just been "stripped" from the mold. Hooks (E) will be disengaged as soon as stripper ram is retracted.

LEFT: Oilgear Heavy-Duty "Power-Pak"—consisting of 3 Oilgear Type "DX-60" Variable Displacement, Two-Way Pumps on a single reservoir base used on this installation—is remotely located, isolated from heat and gritty particles present in the stripping area.

SOLUTION: An *Oilgear Application-Engineered Heavy-Duty System* consisting of an Oilgear "*Power-Pak*" incorporating 3 Type "DX-60" Variable Displacement, 2-Way, Radial Rolling Piston Pumps on a single reservoir base; a 1-in. solenoid-pilot-operated 4-Way Valve; and 2 clevis-mounted Hook Cylinders (A, above). This simple, direct-acting, locked-circuit, push-up-type stripper with remote speed and cycle control . . . space-saving, remotely located "*Power-Paks*" . . . automatic pressure and flood lubrication with continuously filtered power fluid . . . positive, automatic overload protection—has eliminated maintenance downtime problems encountered with the previous mechanical stripper. Long life for continuous, 'round-the-clock production is assured by this automatic, "*Sealed-System*"—aided by the direct application of the pneumatic jarring cylinder to free "frozen" ingots. Lower installation cost, faster—easier accessibility for preventive maintenance are but two additional advantages of this Oilgear-equipped ingot stripper. USER STATES—"*Oilgear was selected because of its simplicity, and the trouble-free, long-life performance record of other Oilgear-equipped machines in our plants.*"

With Oilgear Heavy-Duty System Components designed for thousands of hours of continuous service at full rated load, savings are compounded with every hour of uninterrupted performance. That's why machinery and equipment manufacturers and *their* customers say . . .

"for the lowest cost per year . . . it's Oilgear!"

For solutions to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements directly to . . .

THE OILGEAR COMPANY

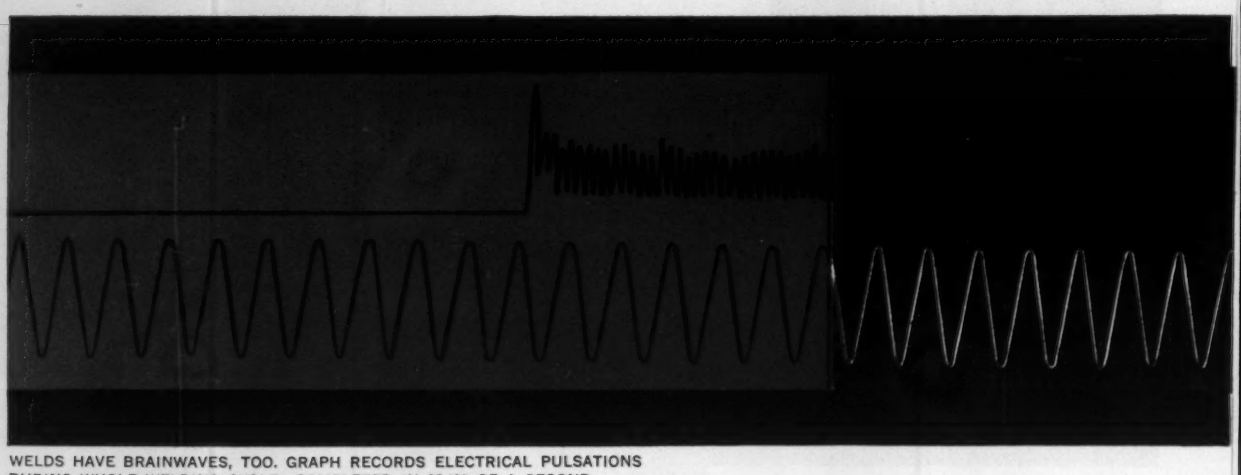
Application-Engineered Controlled Motion Systems

1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

Phone: Mitchell 5-6715 . . . Direct Distance Dialing Code 414

IT HAPPENS IN $\frac{25}{60}$ OF A SECOND / A COMPLETE WELDING CYCLE

LET OLIN ALUMINUM INTRODUCE YOU TO FAST, LABOR-SAVING MIG SPOT WELDING FOR ALUMINUM



WELDS HAVE BRAINWAVES, TOO. GRAPH RECORDS ELECTRICAL PULSATIONS DURING WHOLE WELDING CYCLE—COMPLETED IN 25/60 OF A SECOND.

OLIN MATHIESON • METALS DIVISION • 400 PARK AVENUE • NEW YORK 22, N. Y.

We'd like to show you a joining process that not only cuts your joining costs *substantially,* but also gives you a more salable product.

You might describe this process as riveting without rivets. For two years our Metallurgical Research Laboratories have been studying and refining the MIG spot welding process so that it can be profitably used on aluminum.

Now, we have tests to prove its reproducibility. We can demonstrate that weldments made by this simple, speedy method are as good or better than rivets or resistance spot welds for most applications. In fact, technicians and metallurgists have referred to this process as "metallurgical riveting."

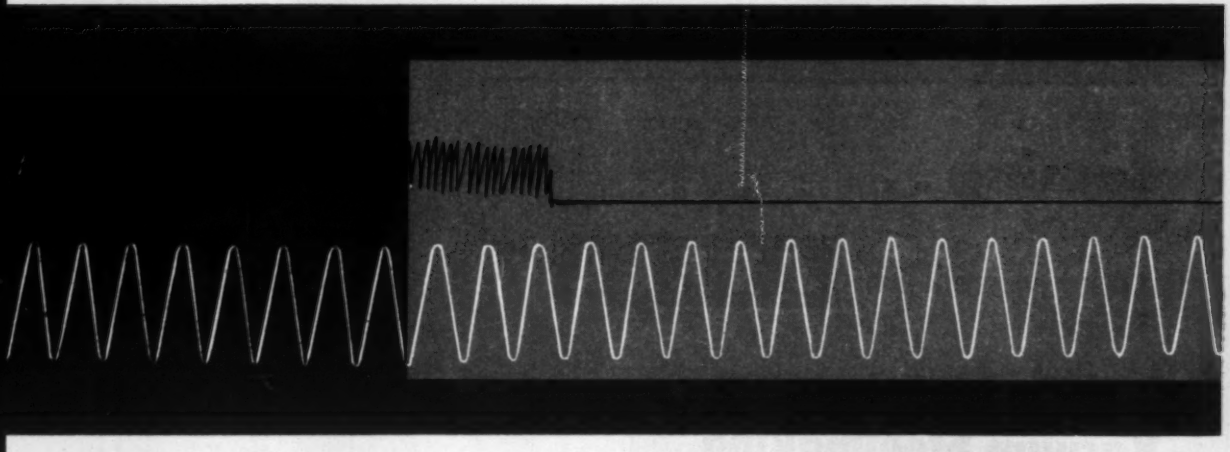
The MIG SPOT WELDING PROCESS overcomes previous difficulties associated with resistance spot welding such as the need for extreme cleanliness and very high capital equipment cost.

Consider the advantages of the MIG SPOT WELDING PROCESS for your particular operations.

FAST—12 spot welds a minute by one operator. Requires only one operator. **LABOR SAVING**—Eliminates hole punching. **SMALL INVESTMENT**—Inexpensive equipment. **EASY TO DO**—Simplicity of the process makes highly skilled operators unnecessary. **PORTABLE, COMPACT EQUIPMENT**—Easily moved to allow spot welding anywhere in the shop. **IMPROVES APPEARANCE**—No unsightly rivet heads. Where appearance is a prime factor, only one side of the weld joint is visible. **EXCELLENT PHYSICAL PROPERTIES**—Tensile, shear and fatigue strength of MIG Spot will equal or better those of rivets or ordinary spot welds. Corrosion resistance is equal to the aluminum alloy which it joins.

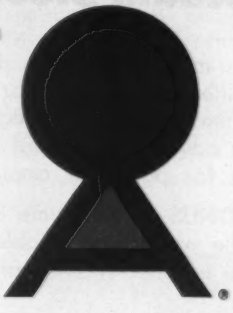
The testing, proving and refining of the MIG Spot Welding Process typifies the kind of progressive thinking at Olin Aluminum. Modesty aside, we're quite proud of the men in our Metallurgical Research Laboratories.

ELIMINATES HOLE PUNCHING, BUCKING RIVETS

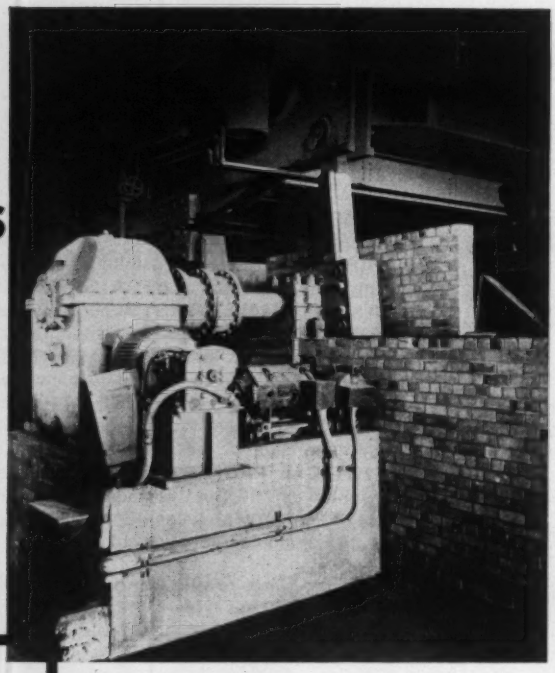


LET US DEMONSTRATE THE ADVANTAGE OF MIG SPOT WELDING FOR ALUMINUM

BOATS
HOUSEBOATS
TRUCK TRAILERS
TRUCK BODIES AND TRUCK CABS
SHIPPING CONTAINERS
GRATING, CATWALKS AND TREADS
RADAR AND ELECTRONIC COMPONENTS
CONSUMER DURABLE PRODUCTS
ARCHITECTURAL APPLICATIONS



Tilting 700-tons of steel furnace



CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Here's a closeup of tilting mechanism for an electric furnace. Standard, stock model, double-reduction Cone-Drive **double-enveloping worm** gear speed reducer tilts furnace and heat with combined weight of 700 tons.

Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

Coming . . .

next week in STEEL

The Outlook for Vacuum Steelmaking

Two metallurgists at Battelle Memorial Institute, Columbus, Ohio, see a bright future in steelmaking for vacuum melting and degassing processes. And they offer advice to potential users on the choice of equipment for particular applications.

A BONUS—In the same issue, STEEL will describe one of the newer consumable electrode, vacuum arc furnaces installed recently at a steel plant in Pennsylvania.

LOOK FOR BOTH STORIES
IN THE NOV. 7 ISSUE OF STEEL

CALENDAR
OF MEETINGS

Oct. 31-Nov. 1, Society of Automotive Engineers Inc.: National diesel engine meeting, Sheraton-Cleveland Hotel, Cleveland. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Oct. 31-Nov. 2, Packaging Institute: Annual meeting, Statler-Hilton Hotel, New York. Institute's address: 342 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Nov. 14-17, Wire Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

Nov. 14-18, American Society of Tool Engineers: Western tool show, Memorial Sports Arena and Ambassador Hotel, Los Angeles. Society's address: 10700 Puritan Ave., Detroit 38, Mich. Executive secretary: Harry E. Conrad.

Nov. 14-18, National Electrical Manufacturers Association: Annual meeting, Traymore Hotel, Atlantic City, N. J. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: Joseph F. Miller.

Nov. 17, National Industrial Conference Board Inc.: General session for all associates, Penn-Sheraton Hotel, Pittsburgh. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Nov. 18, Association of American Railroads: Annual member road meeting, Waldorf-Astoria Hotel, New York. Association's address: 735 Transportation Bldg., Washington 6, D. C. Secretary-treasurer: R. E. Keefer.

Nov. 27-30, Air Conditioning & Refrigeration Institute: Annual meeting, Hollywood Beach Hotel, Hollywood Beach, Fla. Institute's address: 1346 Connecticut Ave. N.W., Washington, D. C. Managing director: George S. Jones Jr.

Nov. 27-Dec. 2, American Society of Mechanical Engineers: Annual meeting, Statler-Hilton Hotel, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Nov. 28-Dec. 2, Exposition of Power & Mechanical Engineering: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

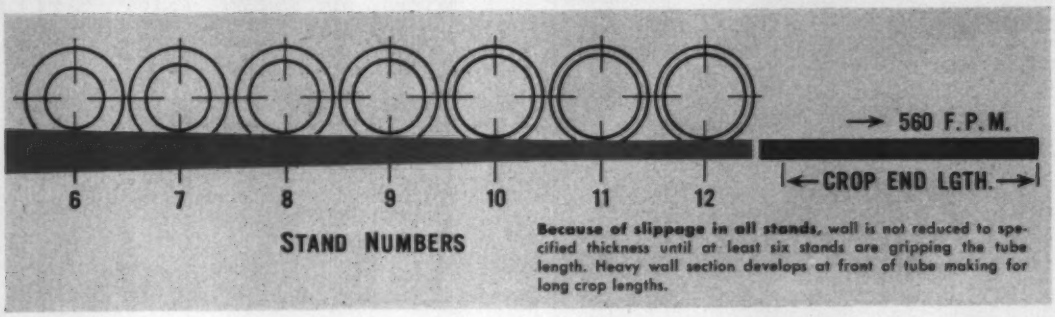
Nov. 29-Dec. 1, Electronic Industries Association: Winter meeting, Fairmont Hotel, San Francisco. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

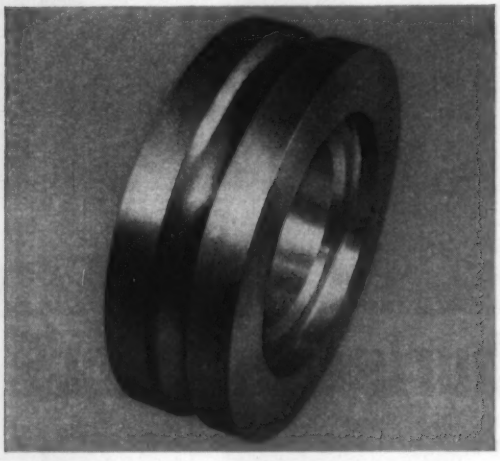
Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

Balancing bite, slip and wear in stretch-reducing rolls



Because of slippage in all stands, wall is not reduced to specified thickness until at least six stands are gripping the tube length. Heavy wall section develops at front of tube making for long crop lengths.

From the roll maker's standpoint, the stretch-reducing mill is full of contradictions. The rolls must provide good "bite" on the tubing, without squeezing it so hard that it buckles. Actually, this is impossible in a pair of stands: in practice, operators have found that at least six stands are needed before the mill starts to produce any reduction in the tube wall. In other words, so much slippage occurs that the tube length is not being stretched at all before the entering end is gripped by the rolls in the sixth stand.



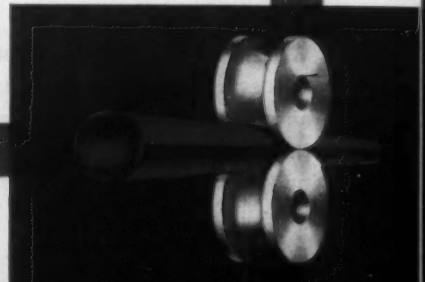
Roll for early stand of a stretch reducing mill, showing pass. Wear is most severe at sides of passes where slippage is at a maximum.

The greater reductions taken in this type of mill as compared to a sinking-sizing mill, combined with the large amount of slippage, make it imperative that the rolls used show good and uniform hardness penetration. Naturally, extremely high hardness is out of the question because of the necessity for good "bite" in order to develop the tension that stretches the tube. However, uniform hardness over the entire pass makes for even wear, easier adjustment as wear increases, and finally, longer runs before redressing becomes necessary.

Actually, our experience with rolls in this kind of service indicates that wear is most severe at the edges of the pass. Hence, any tendency toward lower hardness at the center of the pass may actually make for a balanced rate of wear over the entire working surface.

Mack-Hemp *Technigrain*® low alloy iron rolls consistently turn in enviable performance records in stretch-reducing mills. In the larger newer mills we recommend our nickel alloy iron *Nironite*® annealed to a low hardness for best possible wearing qualities. Both types are carefully controlled to assure an even hardness penetration, and keep slippage to the necessary minimum even with the relatively high reductions taken in each stand.

Mack-Hemp rolls are serving in every type of mill, from the oldest to the very latest designs. As a result, we are adding constantly to our store of data on roll performance. We are pleased whenever roll users call upon us for advice on matters of roll use and selection . . . if you have a specific problem why not 'phone or write us today?



MACKINTOSH-HEMPHILL

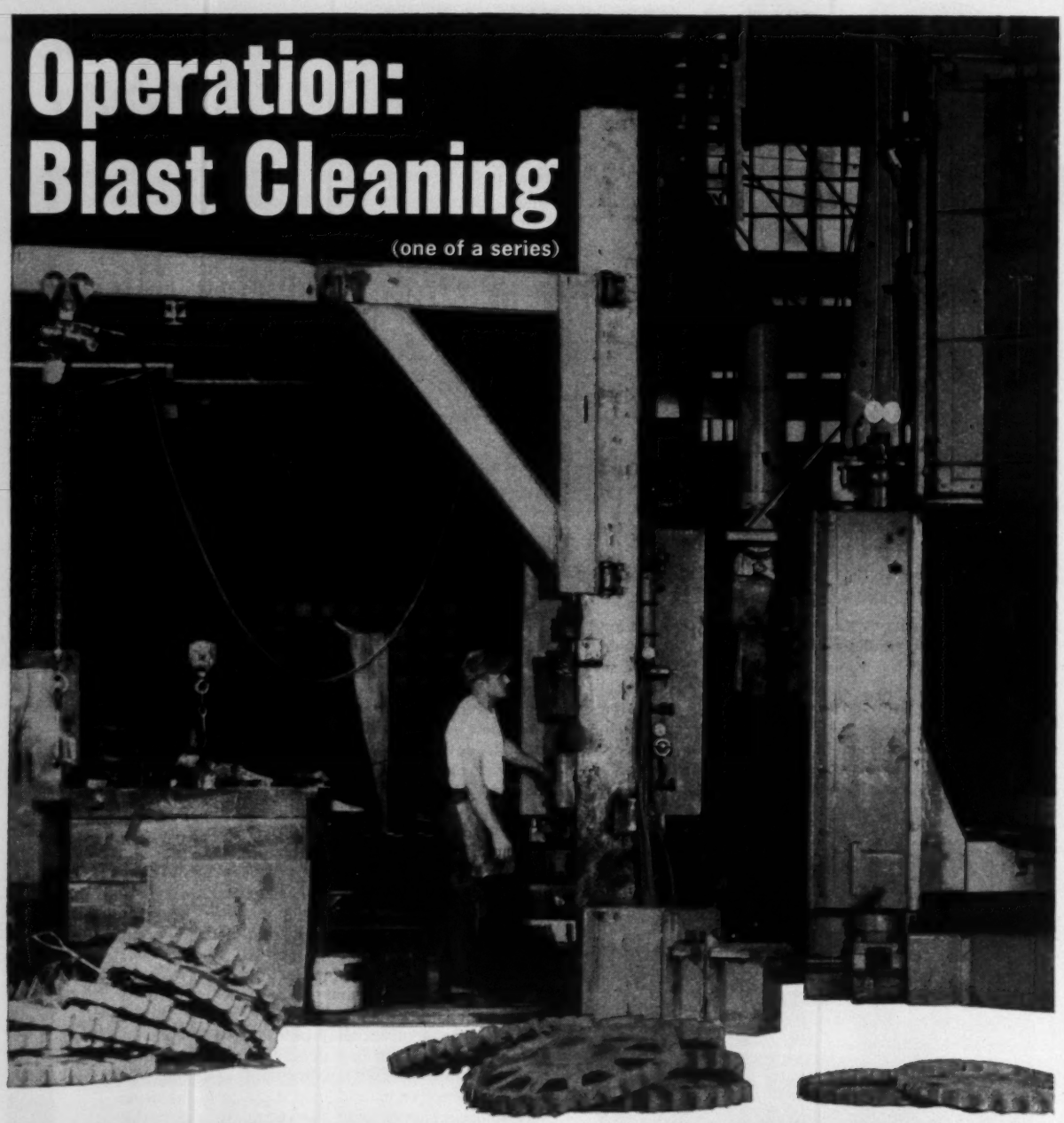
You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery

Operation: Blast Cleaning

(one of a series)



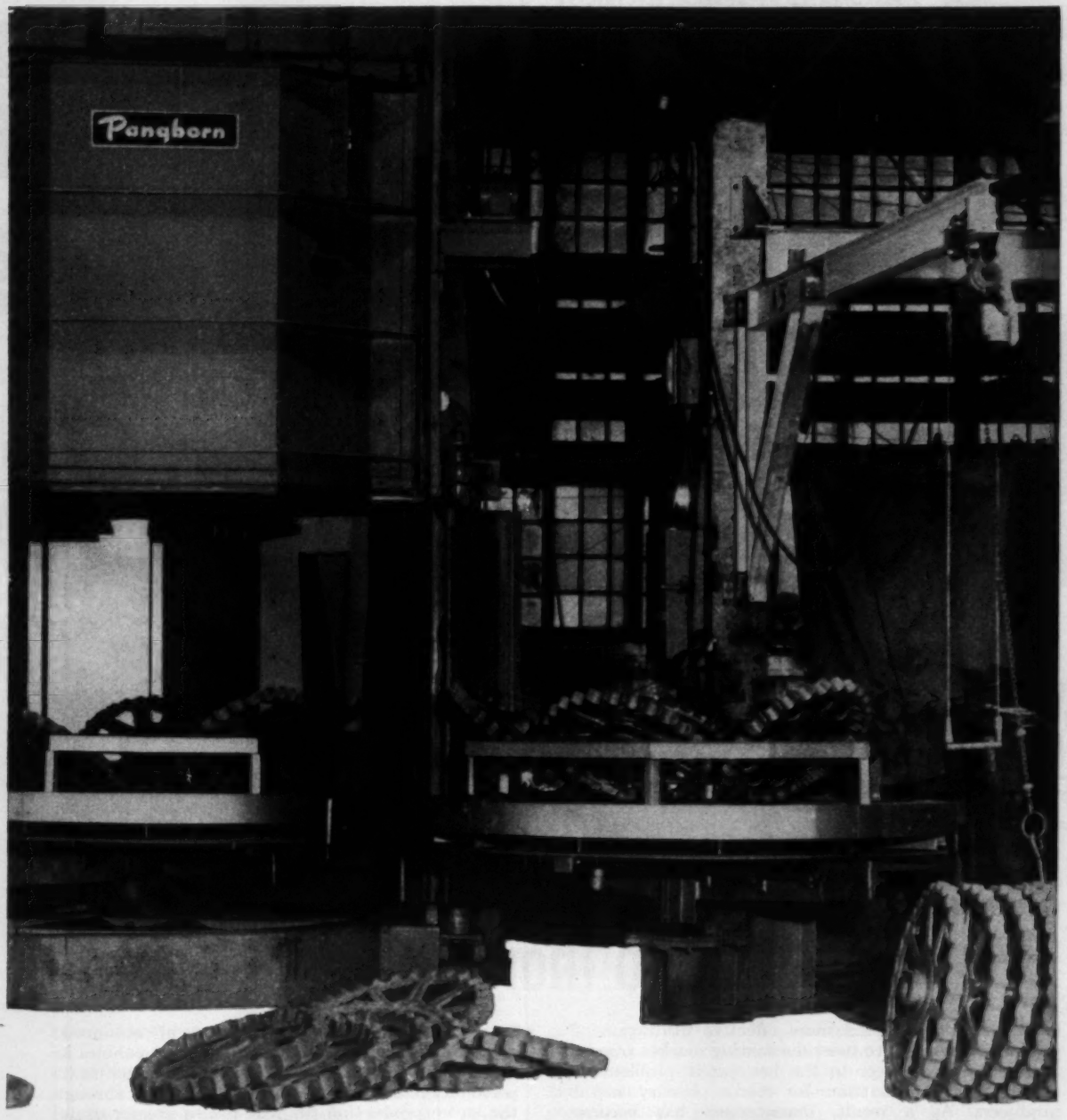
Twin-table Rotoblast hurls 50 tons of

Here's why the Pangborn Rotoblast "LM" Table Room doubled the capacity of the cleaning department at Harrison Steel Castings Co., Attica, Ind.

Inside the "LM" Table Room two Rotoblast Wheels throw 100,000 lbs. of abrasive at the castings every hour. This is blast power at its best. The abrasive hurled in a pattern designed to clean thoroughly every spot on every casting, even on bulky pieces up to 8′ in diameter.

During the cleaning process, castings rest on a rotating work table which increases the efficiency of the blast pattern. While one table is in the machine, its twin is being loaded outside. This makes for quick, continuous operation.

The tables are accessible from all sides (an exclusive Pangborn feature). They handle easily and can be pushed by hand with little effort. In the loading process, their weight is supported by a stationary



shot per hour... cleans twice as fast!

floor pedestal—rather than door hinges—for long life and trouble-free operation.

If the Pangborn "LM" Table Room has doubled the capacity of Harrison's cleaning department, it can do the same at your plant. For complete information write to: PANGBORN CORPORATION, 1600 Pangborn Boulevard, Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast® Steel Shot and Grit.* ™

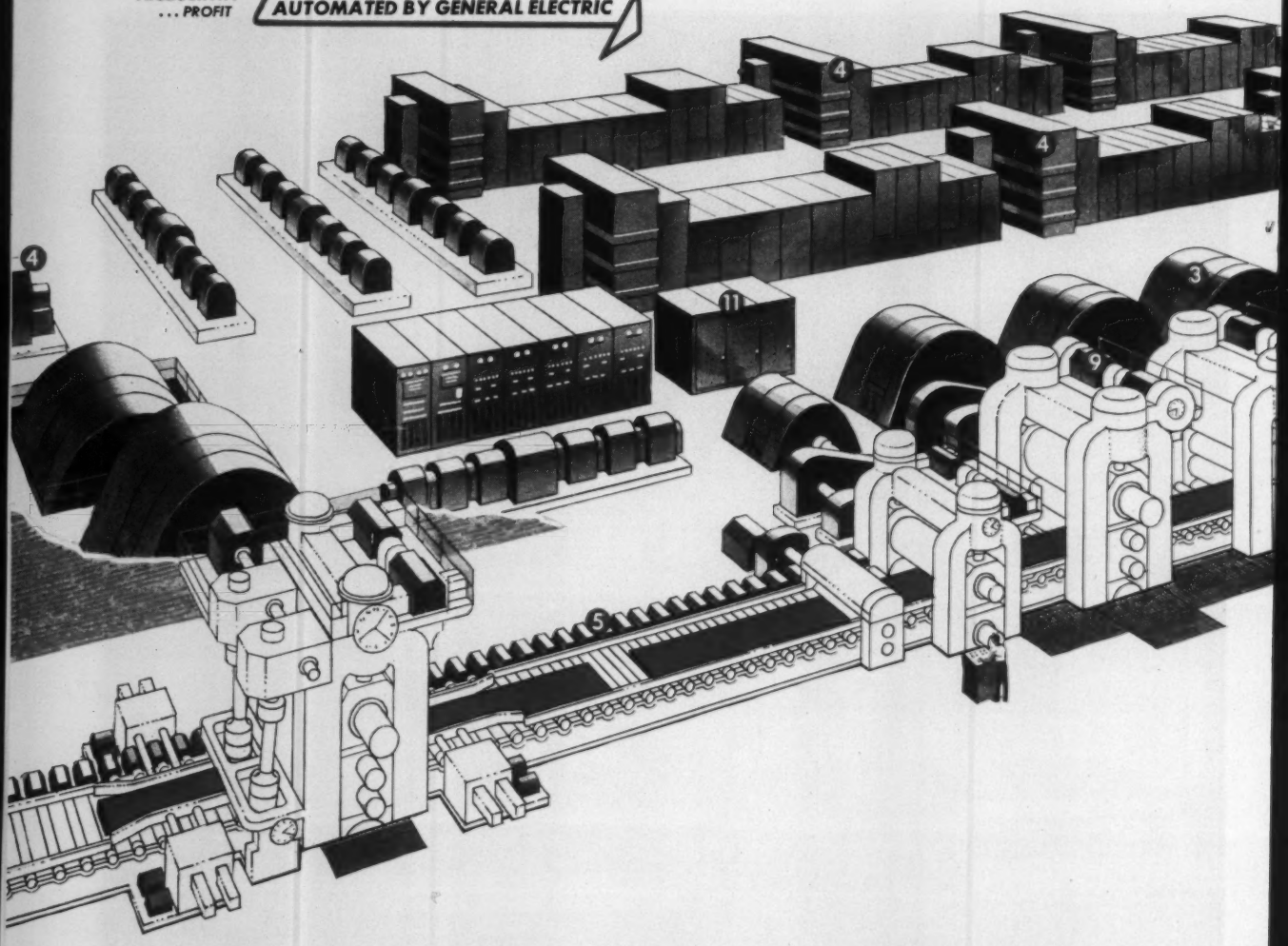
Let Rotoblast abrasives cut your cleaning costs.

A special heat treating process makes Rotoblast Steel Shot and Grit solid and tough, so that they can stand up to much more punishment than ordinary abrasives. Since they last longer, they can make many more passes than run-of-the-mill abrasives. Rotoblast Steel Shot & Grit can reduce your abrasive replacement costs considerably, and thereby decrease your cleaning costs.

Pangborn
OF HAGERSTOWN

FOR QUALITY... PRODUCTIVITY ... PROFIT

HOT STRIP MILLS AUTOMATED BY GENERAL ELECTRIC



GENERAL ELECTRIC'S STEP-BY-STEP APPROACH TO AUTOMATION IS . . .

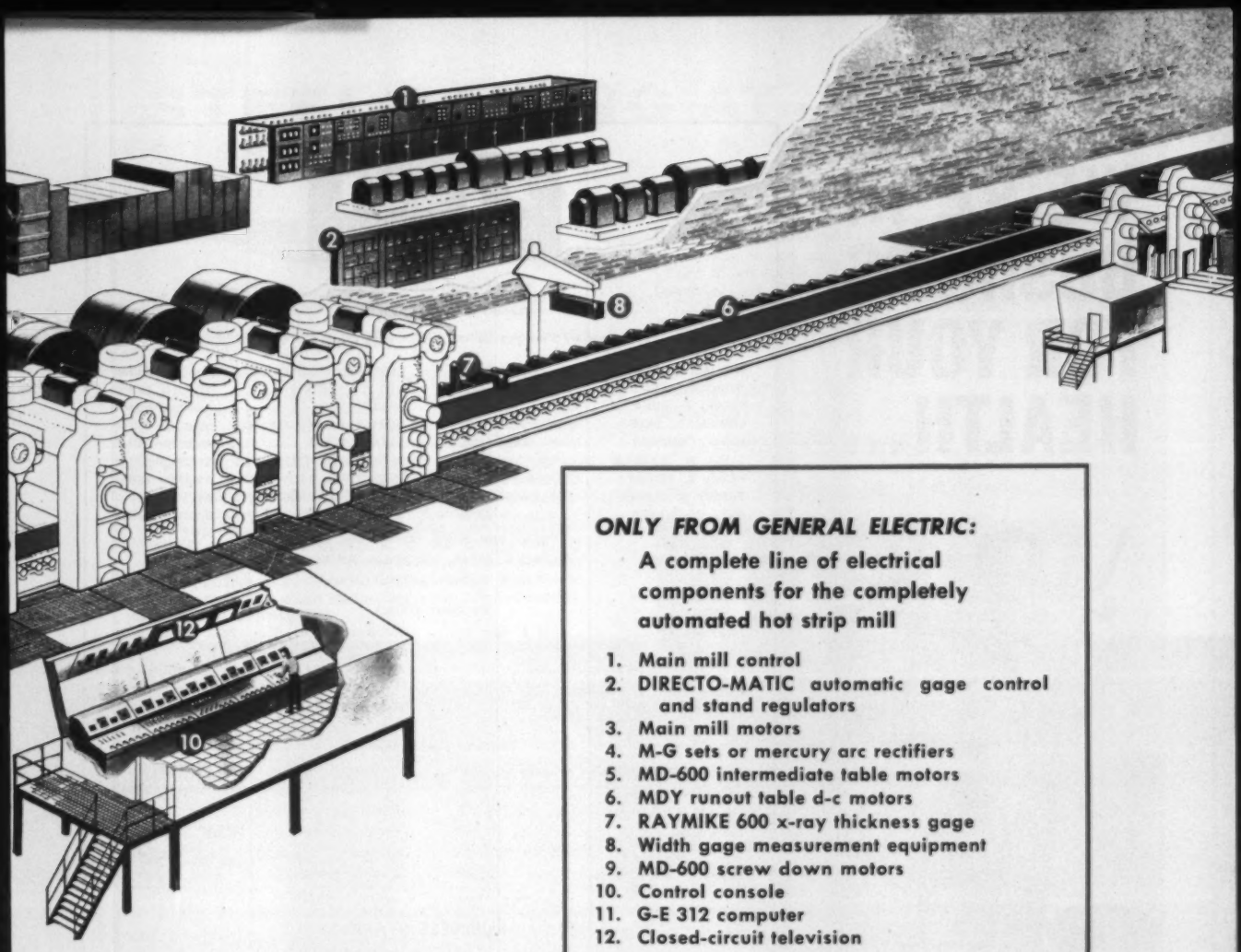
Your key to more efficient control,

EFFICIENT CONTROL and more effective utilization of production systems to meet fluctuating market trends, represents one answer to the low profit problem of undercapacity production for many primary metal producers. As a result, management has become increasingly cognizant of the benefits offered through automation of presently utilized production facilities. Meeting the demands of this trend is General Electric's planned approach to automation which combines economic soundness with predictable benefits.

WITH GENERAL ELECTRIC'S PROGRAM, critical facilities are modernized first. Then, as economic conditions warrant, a complete production area or your entire plant can be automated. Thus, by employing General Electric's logical implementation plan, greater profits are realized due to more efficient utilization of mill facilities, even though production curves decline as a result of changing market conditions.

TYPICAL BENEFITS derived from General Electric's step-by-step approach are inherent in the automation of a hot strip mill:

- **Reduction of scrap losses.** Installation of automatic gage control equipment can reduce strip cobbles as much as 27 percent, lost rolling time as much as 35 percent. Prescribed gage tolerances are met through the entire production run . . . means greater useful surface area per ton of strip produced.
- **Increased mill utilization.** Programming of each stand assures optimum performance and compatibility with adjacent operations. Operating delays and man-hours are reduced . . . mills become more efficient and greater production economies are realized.
- **Reduction in coil diversions.** More exact, continuous automatic control yields desired coils in accordance with customers' orders due to precise rolling capabilities of automated equipment. Since facilities produce only what is required, mills operating under capacity increase production efficiency.
- **Mechanical maintenance savings.** Automation reduces costly down-time and possible equipment replacement due to mechanical breakdowns and damages traceable to equipment abuse.



ONLY FROM GENERAL ELECTRIC:

A complete line of electrical components for the completely automated hot strip mill

1. **Main mill control**
2. **DIRECTO-MATIC automatic gage control and stand regulators**
3. **Main mill motors**
4. **M-G sets or mercury arc rectifiers**
5. **MD-600 intermediate table motors**
6. **MDY runout table d-c motors**
7. **RAYMIKE 600 x-ray thickness gage**
8. **Width gage measurement equipment**
9. **MD-600 screw down motors**
10. **Control console**
11. **G-E 312 computer**
12. **Closed-circuit television**

effective production and greater profit

- **Improved raw material for cold mill operation.** Coils of uniform thickness minimize weld cobbles in cold mill operation, improve quality of the strip produced.
- **Increased management control.** Systems automation provides management with efficient control of manufacturing and scheduling operations. Status reports on various mill operations are readily available for effective and timely business decisions by management. Customers are assured of accurate scheduling of orders. Automated facilities permit early detection of order problems and prevent production delays which could seriously affect customers maintaining minimum inventories.

Automation of hot strip mill facilities represents but one example of what General Electric's plan can do to increase production efficiency, reduce operating costs, minimize maintenance expenditures, improve production quality and provide more effective management control—all for greater profit.

Today General Electric is ready to meet your challenging requirements for automation. Only at General Electric will you find the technology, and advanced electrical equipment capable of providing *any degree* of automation. For your key to more efficient production and greater profit through automation, contact your nearest General Electric Sales Engineer, or write, General Electric Company, Section 659–04, Schenectady 5, New York.

AUTOMATION THROUGH MODERNIZATION

GENERAL ELECTRIC

WE'RE IN BUSINESS FOR YOUR HEALTH...

...and your employees' health. Doctors estimate that 1 in 4 of your employees (whether key executives, skilled workers, experienced secretaries or valued clerks) will develop cancer at some time in their lives. What is worse, many of them may die *needlessly*, unless they know how to guard themselves against cancer.

To help save their lives, call or write our nearest office for information about a free employee education program, geared to your particular factory or office.

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STEELMAKING AT JESSOP

175,000 pounds x 150 mph = shock treatment

The powerful jet engines whine in reduced-throttle restraint as the big, sleek aircraft maneuvers gracefully in its approach pattern.

In the cockpit, the crew goes through a check list. At one point the wheels are lowered and three green lights appear, indicating the gear is in position.

Then, a moment later, the pilot eases the 175,000 pound aircraft traveling 150 miles per hour onto the concrete—safely, surely, with confidence.

Probably, the steel in the landing gear was forged by Steel Improvement & Forge Company of Cleveland. For those components that bear the brunt of the impact, Steel Improvement purchases a Macro-Clean alloy made exclusively by Jessop at its Green River plant.

Only Jessop has it, this tough, sound-centered Macro-Clean alloy that takes in stride the transverse shock imposed on aircraft landing gear.

And the excellent physical properties inherent in Macro-Clean alloys make them ideally suited for numerous other applications too—crankshafts, gears of all kinds, pellet mills, driveshafts, large bearings and oil field goods for example.

Call any of Jessop's 23 sales offices in North America for Macro-Clean aircraft and forging quality alloys and a full range of specialty steels.

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NOW IN RYERSON STOCK...

lower-cost aluminum sheet to help you improve your product

Now you can get immediate delivery on new lower-cost Reynolds aluminum building sheet—any size, any quantity—from large Ryerson stocks.

These sheets open many new opportunities for you to gain the advantages of aluminum without paying the higher price. For example, a company making electrical enclosures for exposed locations was having a problem keeping painted surfaces from peeling and rusting. This manufacturer hadn't considered aluminum because price seemed prohibitive.

A Ryerson specialist recommended a switch to new aluminum building sheet. No painting was required because these sheets won't rust—and resist corrosion indefinitely.

In hundreds of applications you'll find a definite price, product and profit advantage when you use new aluminum building sheet. And remember, Ryerson has worked with more companies in more applications of this new building sheet than any one in the industry. This is a background of experience that can best help you evaluate application possibilities in your operations. Get all the facts from your Ryerson aluminum specialist soon.

It's the "Metalogical" thing to do.

METALOGICS
RYERSON PLUS VALUES

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

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Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

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Nixon Wins STEEL Poll at Metal Show

At the National Metal Congress & Exposition in Philadelphia, 3047 showgoers visited The Penton Publishing Co. booth (above) to vote in STEEL's Presidential popularity poll and give their estimates of 1961 business conditions. The final count found Vice President Nixon getting 62 per cent of the votes and Senator Kennedy 38 per cent. Other results:

	YES	NO
Will business get better if Nixon is elected President?	62%	38%
Will business get better if Kennedy is elected President?	51%	49%
Will your company's sales volume be higher in 1961 than in 1960?	85%	15%
Will your company's profit margin be better in 1961 than in 1960?	61%	39%
Is your company's 1960 profit margin better than it was in 1959?	50%	50%
Do you expect to raise prices in the next six months?	29%	71%
Are you losing business to foreign competition?	45%	55%
Will your company spend more for capital equipment in 1961 than in 1960?	69%	31%

Soviet Steel Output Edges Toward U. S. Level

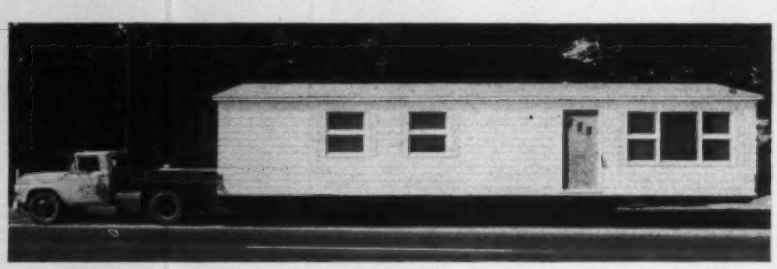
Last January, we turned out twice as much steel as the Soviet Union. Soviet output is almost equal to ours now. We turned out 19.6 million tons in the third quarter; Russia produced 18 million tons. In September, U. S. output totaled less than 6.5 million tons; Russian production hit 6.1 million tons. In contrast, U. S. producers made 34.7 million tons in the first quarter, while the Soviet Union produced only 17.7 million tons.

Purchasing Exec Blasts Steel Industry Salesmen

J. W. Smith, director of purchases and material control, Marion Power Shovel Co., Marion, Ohio, says steel industry salesmen fail to aid the buyer's profit motive. He asserts: "It is a fairly well established fact that you cannot win an election without participating in the primaries. Manufacturers of capital equipment have long applied that thought to selling their products. They get in on the 'dream stage'—the point at which the customer first considers the acquisition of new equipment and has proceeded to investigate models, sizes, capacities, and sources of supply. They . . . aid the customer in establishing the ultimate specifications which will form the basis of an inquiry to several manufacturers. They determine the parties responsible for deciding

what equipment will be purchased; they understand the relation of other facilities and the procedures regarding appropriations. They keep in close touch to modify quotations based on the changes which normally occur and will fight down to the wire to obtain the order. Steelmakers' salesmen . . . have ignored the importance of participating in the primaries. They have been unconcerned over the methods by which the requirements for sizes and shapes are generated. They are more inclined to . . . exchange pleasantries . . . than knowledge and ideas. And it is disgustingly common for them to ask 'What is our share of your business?' "

Homes Are Permanent but Portable



Centex Construction Co., Dallas, prefabricates homes in two sections, trucks them to the building site, and joins the halves. The contemporary styled house has finished interiors, three bedrooms, a bath, diningroom, livingroom, kitchen, and utility room. The foundation is a steel I-beam surrounding the perimeter of each half home. Additional steel beams are welded to the main beams at 4 ft intervals. They're sprayed with automotive undercoating.

AT&T's Kappel Predicts Communication Gains

Pocket radiotelephones, satellite TV, and machine-to-machine "talk," are cited by F. R. Kappel, president, American Telephone & Telegraph Co., as coming things in communication. He says the volume of data communication by electrical circuits will probably exceed the communication of speech in a few years. He also envisions long distance telephoning at a flat monthly rate. He reported that an experimental project will begin next month to switch calls in millionths of a second, not thousandths.

Hupp Prexy Sees Appliance Upturn

D. H. Gearheart, president, Hupp Corp., predicts a sharp upswing in major appliance sales in the fourth quarter. He says dealer orders for 1961 models of his firm's Gibson products are running 74 per cent ahead of last year's pace. The backlog is sufficient to keep Gibson plants at full capacity for several months.

Ford Considering Its Own Galvanizing Facilities

Rumors were widespread last week that Ford Motor Co. had purchased continuous, hot dip galvanizing facilities. But a Ford official told STEEL: "We

have looked at galvanized as a potential product, but any decision is far away. No studies have been presented to management; no funds have been appropriated; no equipment has been bought or ordered." Ford has been a leader in the development and use of galvanized steel—and in welding techniques for the product.

Where Corporate Aid to Education Goes

During the 1958-59 year, corporation gifts represented 15.7 per cent of total voluntary support of the nation's colleges and universities. About 89 per cent of the corporate gift dollar was given directly, 11 per cent through fund raising associations, the Council for Financial Aid to Education reports. Here's where the direct gifts went:

To These Schools		For These Purposes	
Major private universities	7.1%	Buildings, grounds, equipment	27.1%
Public institutions	4.5%	General purposes (unrestricted)	22.9%
Private men's colleges	16.0%	Basic research	21.1%
Private women's colleges	40.5%	Student financial aid	16.3%
Private coed schools	21.2%	Faculty & staff compensation	3.9%
Professional & specialized	6.6%	Other purposes	8.7%

New Steel for Cryogenics

Last week at Morrisville, N. J., more than 350 visitors witnessed tests of a new 9 per cent nickel steel tailored for cryogenic applications. A vessel filled with liquid nitrogen at −320° F survived repeated blows from a 4340 lb weight dropped from heights up to 19 ft. The alloy was developed by International Nickel Co., and produced by U. S. Steel Corp. The containers were fabricated by Chicago Bridge & Iron Co. The finished containers require no stress relief.

Blough Sees Improvement in Steel Demand

Roger M. Blough, chairman, U. S. Steel Corp., believes steel inventories have been pared back to about 11 million or 12 million tons and that an improvement in steel demand will come within three to five months—perhaps before yearend. He is holding to his estimate that 1960 ingot production will be 100 million to 105 million tons. And he is "still hoping" that exports and imports of steel this year will be in close balance—though imports exceeded exports by 472,000 tons during the first eight months.

Will Bethlehem Expand in San Francisco?

Although it is officially denied, rumors are running strong that Bethlehem Steel Co. will expand its plant in South San Francisco. Half the firm's board arrived in the area this month on an inspection trip. The company acquired 575 acres adjacent to its plant in May. Observers see two possibilities: 1. Installation of facilities to make hot and cold rolled sheets, tin plate, and galvanized products. 2. Substitution of electric furnaces for open hearths.

Share-the-Risk Plan Gets Stronger in Exec Hiring

Look for more companies to adopt a share-the-risk policy in hiring executives for jobs paying $18,000 and above. Lon D. Barton, president, Cadillac Associates Inc., Chicago, says there is a strong trend toward withholding part

of a new executive's compensation for six to 12 months—until he has proved his worth. Mr. Barton says there is terrific demand today for executives who: 1. Can use existing manufacturing and marketing facilities to make and sell different products. 2. Will make decisions and assume responsibility without undue delegation to management committees.

U. S. Products Have Poor Image in Europe . . .

Many European consumers believe U. S. products have poor workmanship, purposely lack durability, but excel in packaging. So finds a six-country survey by Roc International, associated with Market Facts Inc., Chicago. William O'Dell, Market Facts president, says the image is based on a stereotyped view of the national character, which pictures Americans as dynamic, progressive, and practical but too materialistic, superficial, naive, and lovers of luxury. Many Europeans object to planned obsolescence.

. . . But European Products Have Good Image Here and Abroad

Roc International (see above) also queried Americans and people in the six countries mentioned above about European goods—Europeans expressed opinions of products not made in their own country. Here's a capsule summary of what consumers in all seven countries think of European products: German and Holland goods—Sturdy, reliable. French goods—Nondurable but charming and graceful. Italian goods—charming, stylish, but not reliable. Swedish goods—Simple, sturdy, of sound workmanship. English goods—Purposeful, well-made, modest in appearance.

Straws in the Wind

The Elgin, Joliet & Eastern Railway (owned by U. S. Steel Corp.) has granted a net pay increase of 4.8 cents an hour in two steps to the Brotherhood of Railroad Trainmen—averting a strike that could have throttled operations at all Chicago district plants of U. S. Steel . . . Ling-Temco Electronics Inc. has developed a compact, commercial, TV broadcasting station priced low enough to bring TV to communities that have been considered too small . . . Reynolds Metals Co. is attempting to promote the sale of aluminum building products through lumber dealers . . . Net new orders for cutting type machine tools totaled $42.45 million in September, down $7 million from August, but "satisfactory," says National Machine Tool Builders' Association.

Metalworking Pulse

The Business Trend: Continued strength in the auto industry and small but steady gains in steelmaking and carloadings pushed STEEL's index to a preliminary 154 (1947-49=100), highest point in the second half of 1961. **Autos:** Schedules for November and December will be trimmed significantly. Fourth quarter output: Probably 1.4 million units or less. **Steel:** Production has exceeded that scheduled each week since the Labor Day holiday period.

- **INDUSTRIAL PRODUCTION**
  Week ended Oct. 22 . . 154†
  Year ago 116
  Details on Page 49
- **PASSENGER CAR PRODUCTION**
  Week ended Oct. 29 . . 155,000*
  Year ago 101,616
  Details on Page 46
- **INGOT PRODUCTION RATE**
  Week ended Oct. 30 . . 53.2%†
  Week ago . . . . . 55.4%.
  Details on Page 92

†Preliminary. *Estimated.

Copyright 1960 by STEEL, Penton Building, Cleveland 13, Ohio

Here's the quick, low-cost way to get any Controlled Surface Finish

Are you paying more than necessary to obtain *controlled surface finishes?* You probably are if Gisholt Superfinishing is new to you. You are losing time, money and paying a premium for quality as well, on many jobs.

With Superfinish you preselect the surface finish you need—as high as 80 or as low as 1 micro-inch RMS—and you get it faster, at less cost than by any other method. Rather than an expensive extra step, Gisholt Superfinishing actually eliminates tedious, more costly processes.

Not only do you save time and money, but you get a "controlled" surface finish, free of smear metal—with the true base metal exposed—one that provides greater area contact for heavier loads and longer life in your specific application.

Whether your job requires a 1, 20 or 80 micro-inch finish, setup is fast and easy. Nothing is left to the operator's skill or judgment. Stone pressure and grade, and reciprocation rate are preselected to produce the finish you require, for job lots or large production runs.

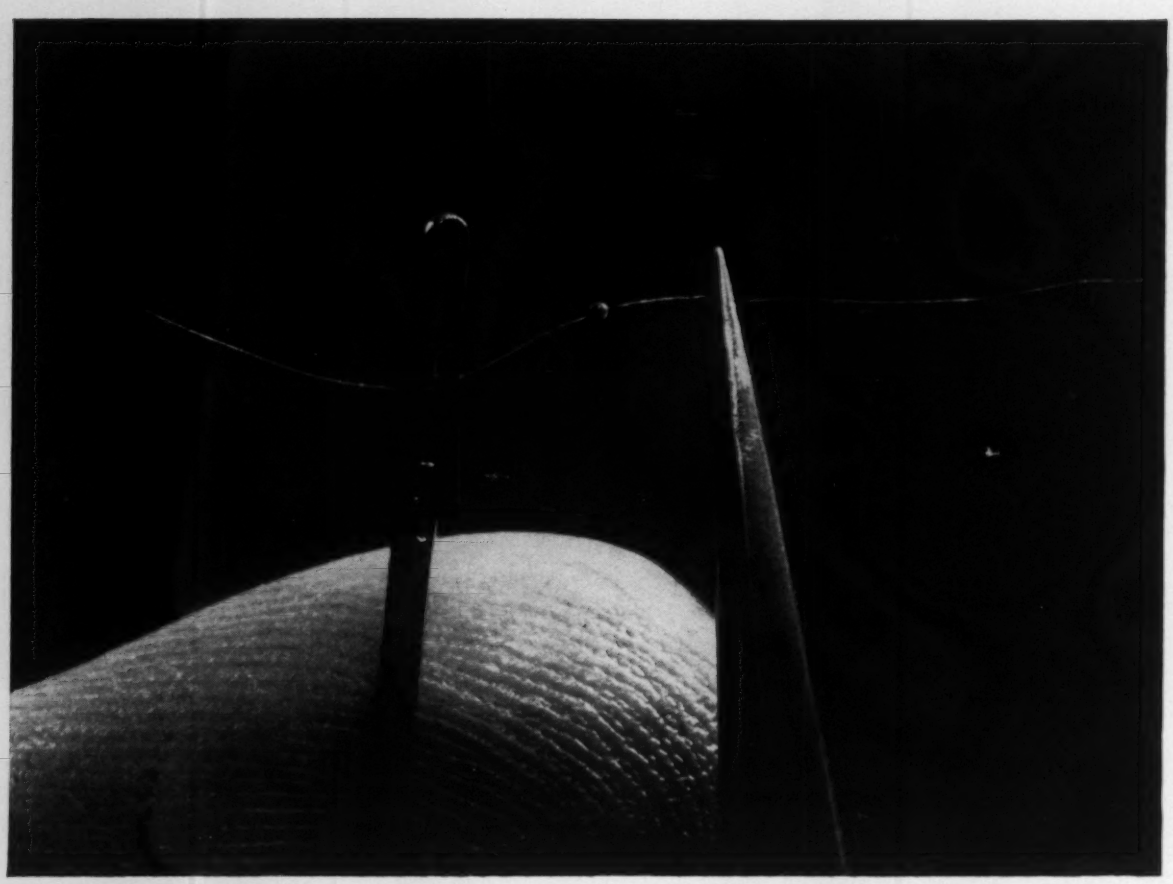
It will pay you to find out how Gisholt Superfinish can cut costs, improve quality and lengthen service life on your standard or problem parts. Ask your Gisholt Representative or write for Bulletin 1169.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • *Factory-Rebuilt Machines with New-Machine Guarantee*



Needle's eye reveals relative size of the thermistor, a tiny bead of Nickel oxide and other materials, used to measure temperatures in and beyond the earth's thin envelope of atmosphere. Made by Gulton Industries, Inc., the thermistor now serves in more than a dozen different missiles and satellites.

"Space thermometer" goes thru needle's eye

Meet the bead thermistor, member of a family of electronic devices now going into everything from midget radios to giant computers and missiles.

This particular thermistor measures temperatures in space — temperatures ranging from 572°F all the way down to 76° below zero Fahrenheit.

You can hardly see the bead with your naked eye. Although it's only *a hundredth of an inch* in diameter, and the lead wires are a mere thousandth of an inch thick, the thermistor is an extremely stable and rugged device, accurate to within a fraction of a degree Fahrenheit.

Made of Nickel oxide and other materials, the thermistor is a space-traveler in many of today's missiles and satellites. It reliably reports on gradients of temperature within the earth's thin atmospheric shield and in outer space. At the same time, it helps record the temperature changes in the missile's skin and its interior.

What is a thermistor? Its name, which comes from THERMal resISTOR, begins to explain. Temperature changes as small as 1/50th of a degree produce a measurable change in the electrical resistance of the pellet. The resulting increase or decrease in circuit current can then be used directly, as a signal, or can be recorded in the form of temperature readings.

Originally developed by Bell Telephone Laboratories for communications equipment, thermistors are now widely used where a tiny, precise, and dependable thermometer is needed: in medical research, in over-load switches to protect electric motors, and in shipment of perishable foodstuffs, for example.

The role of Nickel in the thermistor is only one example of the remarkable versatility of this element.

Be sure to investigate Nickel and Nickel compounds whenever you are faced with a problem calling for unusual electrical or electronic properties... in fact, for *any* unusual metal problem. And don't hesitate to call on us for technical data to help you solve your material-selection problems.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N.Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

'61: Time for the Hard Sell

A friend of ours runs a successful, medium sized metalworking company. We asked him how he intends to conduct his company's affairs in 1961.

Listen to what he said:

"The one thing we know positively about 1961 is that it is going to be a tough, competitive year.

"We think it is going to be tougher than 1960. We will have to cope with the continuing problems of higher material, labor, and selling costs; foreign competition; and the squeeze on profits.

"But we don't buy the thinking of economists who see a severe business recession in 1961.

"Their predictions are too pat.

"We think that they will be just as wrong about 1961 as they were about 1960.

"Based on the gross national product, which we follow as the primary economic indicator, we figure that the general level of business in 1961 will be no more than 2 per cent below 1960's.

"As for our strategy in 1961, it is this:

"With the pressure to keep prices down, we will have to increase our sales to maintain total profits.

"So our sales department is not going to waste time running up blind alleys looking for new applications.

"We are going to concentrate on known users of our products. Right now, we are doing field surveys to make sure we don't miss any.

"In our production department, we are going to demand closer inspection to maintain product quality and strict adherence to production schedules so customers will get deliveries on time.

"In January, we will announce a couple of new, improved products.

"All through our organization, we are going to insist that our people do an honest day's work for the money we are paying them.

"With that approach, we are confident that we can meet both domestic and foreign competition and have a still better year in 1961.

"In our book, 1961 is going to be the year for the hard sell."

We couldn't have said it better!

Irwin H. Such

EDITOR-IN-CHIEF

CF&I Heavyweight Shaped Coils

PACKAGED for YOUR PRODUCTION

Mr. Marwil points out in-plant handling and unloading is more efficient and economical with CF&I Shaped Coils than with mill coils. Shaped coils can also be stored more compactly.

give long production runs at Marwil Products Co.

With a 12 million unit annual capacity, Marwil Products Co., Fort Loramie, Ohio, is rated as the largest U. S. manufacturer of muffler clamps and U-bolts. Nine months ago the company switched to CF&I Wire. Mr. William Marwil, Vice President tells why:

"We find CF&I's 2000 lb. shaped coils of clean, bright basic wire are very uniform, with no 'thin' areas or rough finish. These large coils give us longer runs without the necessity for frequent set-ups on our Lewis Cut Off machines."

In addition to the high quality of CF&I Wire, new packaging methods have increased the preference for CF&I Wire.

Replacing small, light-weight coils are CF&I Shaped Coils and spiders. The spider, leased from CF&I, acts like a spool, and pays off the wire evenly and smoothly. Now, instead of losing hours of production time every day in changing small coils or unravelling tangled wire, *one* CF&I Shaped Coil can usually last many hours. The shaped coils and spiders make for easier handling and storage, too.

One of our salesmen will be glad to recommend the right "package" to increase your production and cut manufacturing costs. You can call your nearest CF&I sales office today and arrange a "no obligation" visit.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

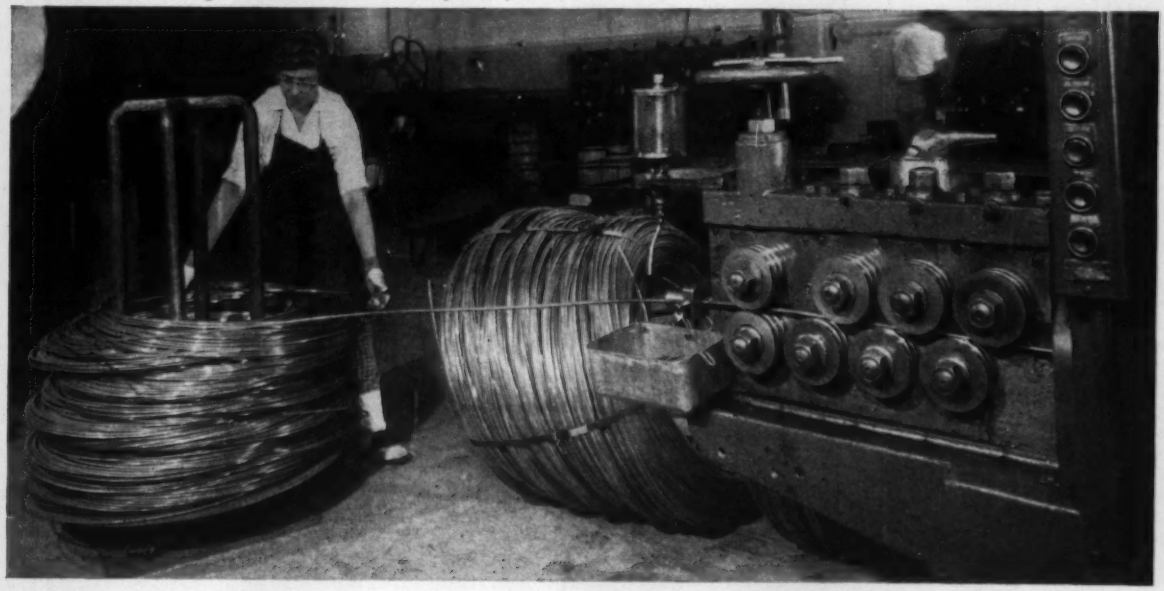
7348

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

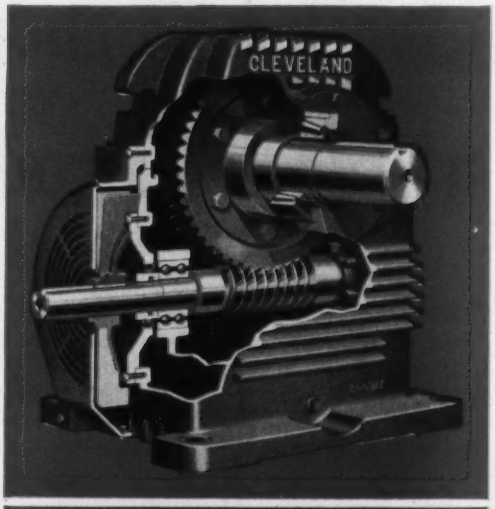
CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

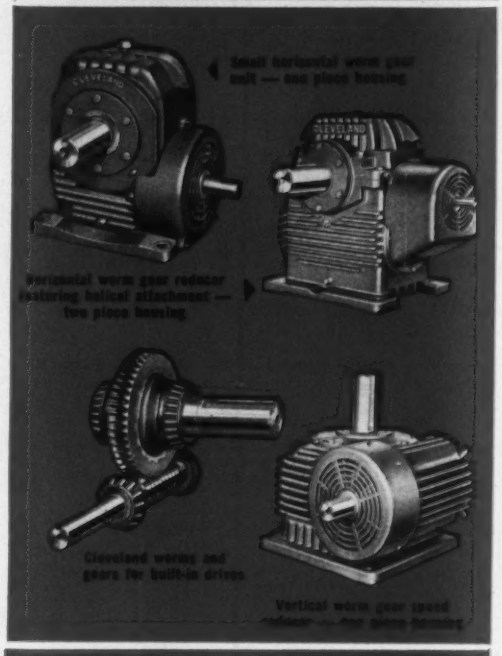
CF&I Wire being fed into the Lewis Cut Off machine. This machine cuts wire into 5" to 20" lengths at a rate of about 150 pieces per minute.



for smooth, quiet, dependable, right-angle power transmission, specify...

HIGHER HP CLEVELAND SPEED REDUCERS




Small horizontal worm gear unit — one piece housing
Horizontal worm gear reducer featuring helical attachment — two piece housing
Cleveland worms and gears for built-in drives
Vertical worm gear speed reducer — one piece housing

During a lifetime of trouble-free service, these versatile space-saving Cleveland's will transmit power uniformly, smoothly, dependably—under even the most severe operating conditions. Clevelands actually improve through use. Thousands of units have outlasted their driven machines.

During the last half century, Cleveland has designed and produced a complete line of standardized and special worm gear speed reducers as well as industrial worm gearing for built-in drives to handle almost every type of power transmission application.

Now, Cleveland's use of fan cooling, centrifugally cast bronze gears and special heat treatment of alloy steel worms permit substantially higher input HP and output torque ratings—with smaller units.

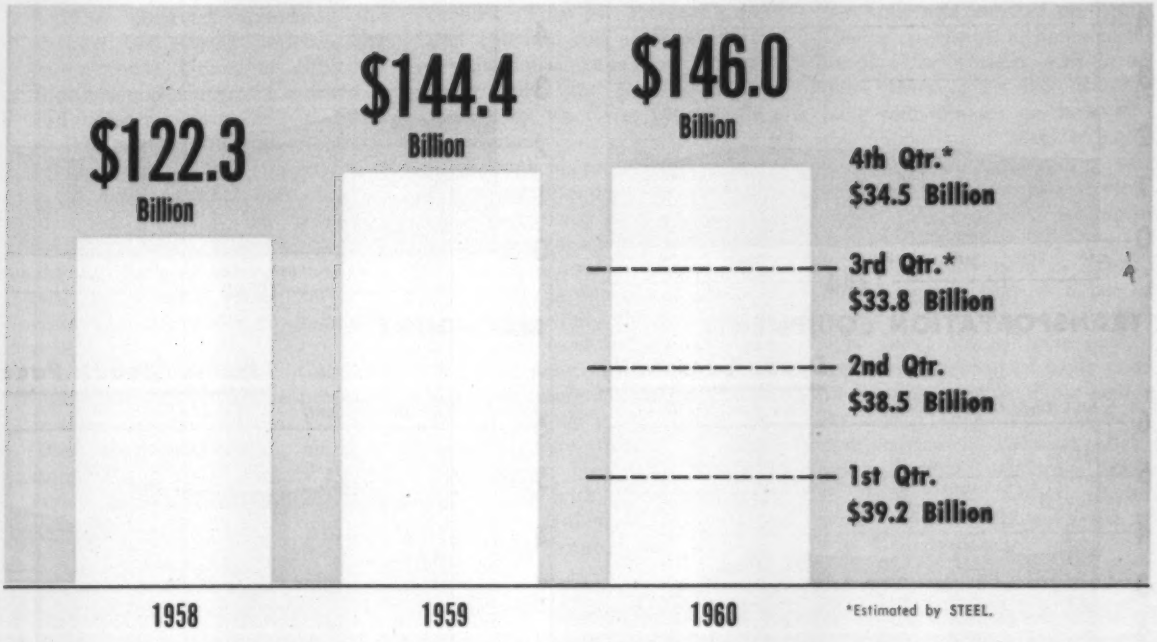
Cleveland's wide knowledge of worm gear capabilities enables their field representatives to offer valuable engineering assistance in solving power transmission problems. These experienced engineers will gladly provide you the advantage of "on location" advice and counsel.

Write today for your personal copies of the up-to-date illustrated Bulletins shown at right. They describe the finest, newly-designed line of higher-horsepower worm and gear speed reducers—available *anywhere* in the world.

Cleveland Worm & Gear Division
Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio

CLEVELAND
Worm Gear
Speed Reducers

Metalworking Sales Head for Record



METALWORKING—this country's largest industry—is well on its way to a sales record this year.

Computations by STEEL indicate the 1960 total will approximate $146 billion compared with the record $144.4 billion of 1959.

The gain (1.1 per cent) is shaping up in spite of the sharp drop in business in the steel industry and declines in numerous other segments of the economy. (Third quarter steel production in the U. S. was 44 per cent below the record first quarter output.)

• **The Method**—In making its estimate, STEEL had the benefit of U. S. Commerce Department figures for the first eight months of this year. For each of the remaining four months, STEEL used a sales level slightly below that of August (a relatively slow month), except for transportation equipment—a modest seasonal increase is expected in that category.

The third quarter will probably be the low one this year (see chart above). Metalworking sales of $33.8 billion were 14 per cent below the first quarter's $39.2 billion. A seasonal improvement is expected to put the fourth quarter at $34.5 billion, 12 per cent under the first quarter performance.

• **High Months**—March and June were 1960's high months for metalworking sales. March sales were $13.7 billion, and June's were $13 billion.

The increase in metalworking sales is coming from two things: 1. High level of business in all of metalworking in the first quarter. 2. Continued strength throughout the year in the metal consuming industries (see charts on Page 30), which customarily account for 90 per cent of metalworking sales. The remaining 10 per cent comes from the steel industry.

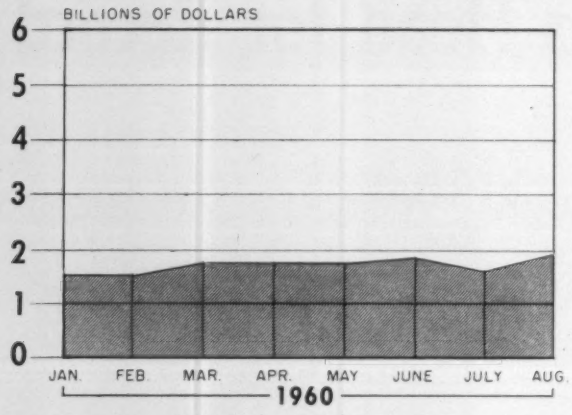
Fabricators of metal products saw their sales climb through the first eight months (the latest period for which figures are available). Machinery sales remained fairly steady. Although transportation equipment sales declined seasonally in the late summer, they are expected to turn upward as production of 1961 model automobiles accelerates.

• **Sales Famine**—Consumers of steel elected to reduce their inventories. While they were living largely off inventories, the steel industry was starving for orders. Because the

How Sales Are Going in Four Major Metalworking Areas

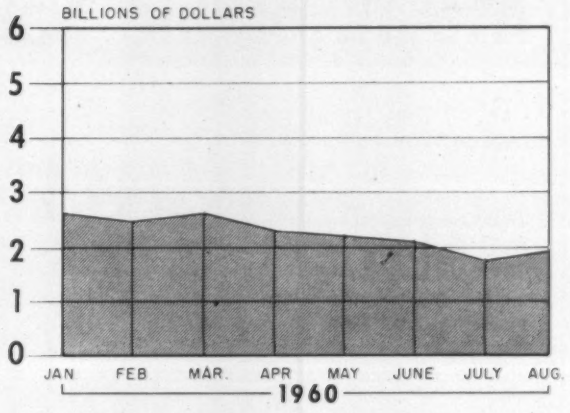
FABRICATED METAL PRODUCTS:

A Good Year



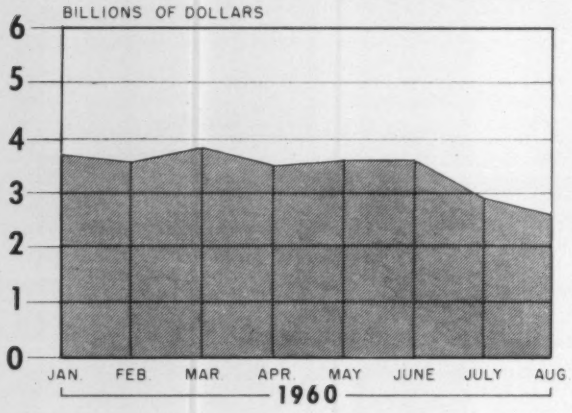
PRIMARY METALS:

Customers Buy Sparingly



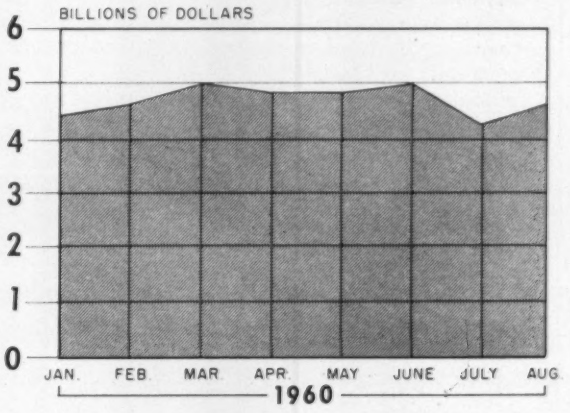
TRANSPORTATION EQUIPMENT:

Drops Seasonally



MACHINERY:

Holds Steady Pace



iron and steel industry accounts for around two-thirds of all sales in the primary metals classification, the big drop in steel sales sent the primary metals sales downhill.

• **Aluminum Shines** — In contrast with the slump in steel, one of the segments of primary metals (aluminum) has been doing slightly better this year than it did last year when it set a production record. Primary aluminum production in the first nine months of this year totaled 1,520,772 net tons compared with 1,462,615 tons in the corresponding period of the last year, and promises another record (see Page 106). (Tonnagewise, aluminum is the second largest primary metal in U. S. production.)

Even though steel demand has been shrinking markedly, total production of steel for ingots and castings this year should measure 100 million net tons, or perhaps slightly more. This would be the sixth best year for steel output in the U. S., thanks largely to record production in the first quarter.

• **Minimal Inflation**—The enlarged dollar volume of metalworking sales comes primarily from an increase in physical volume, rather than a rise in prices. The government's wholesale price index of all commodities other than farm products and food in the week ended Oct. 16 was 127.6 per cent of the 1947-49 average compared with a monthly average of 128.4 per cent in October, 1959.

More specifically, the average of the government's wholesale price index on machinery and motive products in the first eight months of 1960 was less than four-tenths of 1 per cent above the average for all of 1959.

Other evidence: The wholesale price average of metals and metal products was up less than one-half of 1 per cent.

Cost of Living: On Way Out?

GE and Westinghouse won their battle to drop it from their contracts. The next major push against the provision may come in the auto negotiations

LABOR observers appraising the contract settlements between the International Union of Electrical Workers and General Electric Co. and Westinghouse Electric Corp. chalked up a major victory for the firms:

The controversial cost-of-living provision was dropped, something the major steel companies were unable to do even though they did win an effective ceiling on such costs and tied them to insurance costs.

Next major question: Can the automakers eliminate the provision in their contract talks next summer? They aren't commenting on their intentions, but the issue is almost certain to provide fire for the bargaining sessions.

• **Different Techniques** — Negotiations at both electrical firms also provided an interesting contrast in bargaining techniques: GE's Boulwareism (making only one offer) and Westinghouse's willingness for flexibility on terms as long as the total costs of the contract package did not exceed what the company was willing to pay.

At one point in the negotiations, Westinghouse had offered an immediate pay increase ranging from 5 to 14 cents per hour. But Al Hartnett, IUE secretary-treasurer, who led the union bargaining team, pushed for an eighth paid holiday and four week vacations after 20 years. To get them, the IUE was willing to trade for a lower wage increase (4 to 10 cents), dropping the company offered retraining program, and a lowering of one fringe benefit.

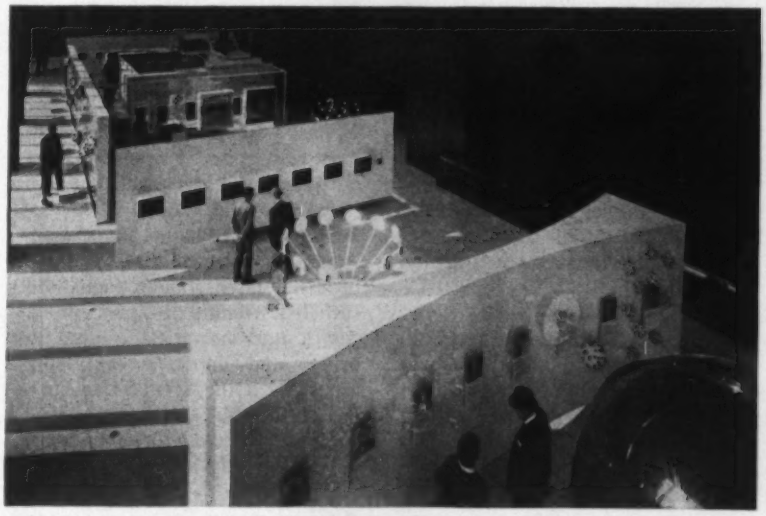
• **Carey Lost**—IUE President James Carey lost his battle against "Boulwareism" (see STEEL, Oct. 17, p. 81). The first blow came when the big Schenectady local, led by Leo Jandreau, business agent, went back to work. Then Mr. Hartnett's decision (he had full authority at the Westinghouse bargaining table) to settle pulled the props from any attempt by Mr. Carey to strengthen his position.

Although his prestige was shaken, Mr. Carey is in no danger of losing his job—he has been re-elected to his $25,000 post for a four year term. His key problem now is whether to discipline Mr. Jandreau and his local. The Schenectady labor leader brought his local into the IUE from the left wing United Electrical Workers—many feel he'd have little trouble pulling it out again and operating independently.

Proof that the strike wasn't a popular one with the workers came when the settlement at Westinghouse was announced. Workers danced in the aisles at the plants when the news broke.

• **Provisions** — Highlights of the Westinghouse settlement: An immediate pay boost of 4 to 10 cents per hour and another on Apr. 16, 1962; a new layoff income and benefit plan for workers with three or more years of service. Employees have four options on how to use the money—one week's pay for each year of service, four weeks' vacation after 20 years of service, an eighth paid holiday, or improved fringe benefits.

The GE settlement included: An immediate pay hike of 3 per cent. In the next three weeks, the union must select one of these options—second wage boost of 4 per cent in 18 months, another 3 per cent pay boost plus an eighth paid holiday and four week vacation after 25 years of service, or a wage reopener in April, 1962. Other provisions were similar to those in the original General Electric offer.



A WORKING MODEL OF A NUCLEAR REACTOR has been put on display in the lobby of the new Union Carbide Building in New York. Formerly scattered, Union Carbide Corp. divisions have been brought together in the new structure, which rises 52 stories and ranks among the highest skyscrapers. It is sheathed with curtain wall units of glass, natural stainless steel mullions, and black coated stainless steel spandrels

European Purchasing Executive Gives Tips on . . .

How to Buy Abroad

Finding the source of supply.

Checking the suppliers' standing.

Negotiating the purchase price.

Assuring quality and delivery.

Setting up contracts and trade terms.

JOHN R. BLINCH
Executive Secretary
European Federation of Purchasing Officers

"THE PURCHASING AGENT who is going to give his firm the edge on its competitors is the one who adopts an active rather than a passive approach . . . not only to domestic but also foreign sources," declares John R. Blinch, executive secretary, European Federation of Purchasing Officers, London.

Mr. Blinch is touring the U. S., running seminars on the problems of buying abroad. His sponsors: The Industrial Education Institute and the Materials Management Institute, both of Boston.

• **Getting Information**—Alert buyers will not wait to be sold but will seek out information, Mr. Blinch points out. He lists several ready sources of such information:

The commercial staffs of foreign embassies and consular offices help buyers obtain data about their countries' supplies.

Trade fairs are a valuable means of picking up ideas and establishing personal contacts with new supply sources.

In many countries, purchasing agents associations, modeled after the National Association of Purchasing Agents in this country, have been formed and can provide information.

A large organization will use its purchasing department in a country as a supply channel for that country's products. Even firms without purchasing departments can use sales offices to advantage for such purposes.

Small and medium sized companies, not large enough to handle a sufficient volume of business to justify a purchasing staff, often find export and import agents helpful especially if the agents' trade is not too diversified.

Trade directories, journals, and catalogs are also helpful.

• **Checking the Source**—The standing of an overseas supplier should be established before he is given an order, advises Mr. Blinch. If the volume of orders is sufficient to justify the cost, a personal visit to a new principal supplier is desirable —even then, bank investigations should be made. Mr. Blinch adds that commercial intelligence agencies, such as Dun & Bradstreet Inc., are valuable sources of information —in the future, purchasing associations may have a role in this area.

• **Bargaining** — Mr. Blinch states that differences between firms are more important than differences between countries. Foreign suppliers are not as accustomed to providing their customers with cost breakdowns to back up quotations as U. S. firms are, but Mr. Blinch suggests that if the suppliers want your business badly enough, they will be willing to supply such information.

In the Middle East, bargaining is expected and no doubt will be allowed for in the original quotation, observes Mr. Blinch. He notes that as you move north, there is less willingness to negotiate upon the originally quoted price, and there is a greater tendency for prices to

react sharply to changes in the state of the market.

Although English is being used increasingly as the language of business, Mr. Blinch regards it as a courtesy to read or understand the suppliers' language if he wishes to use it. The buyer is also in a poor tactical position if he does not at least understand the gist of what is being said during a personal visit. Interpreters are helpful but should be carefully chosen, especially when technical language is used extensively to assure clarity.

• **Checking Quality**—British buyers have generally found no difficulty in having specifications accepted by overseas suppliers, relates Mr. Blinch. But he recommends a more thorough investigation into quality on a first order than would ordinarily be required for domestic shipments. Because of the distances involved, adjustments are often difficult. In cases where the size and importance of the order do not warrant the expense of inspection by the buyer, international inspectors (such as Bureau Veritas, Cargo Superintendents, or Lloyds Agents) may be worthwhile. Mr. Blinch says the risk of misunderstanding can be reduced by quoting both the U. S. and overseas specifications whenever possible.

• **Delivery**—As the individual gains experience in overseas supply, he will be able to determine how much he can trust foreign companies and countries, Mr. Blinch says. Weather plays a greater role in overseas shipping than it does on the domestic front. "All-risks" insurance against damage due to weather is cheap and worth using, advises Mr. Blinch. It is also possible to insure against delays caused by dock strikes.

• **Contracts**—Mr. Blinch warns: Reliance on purchasing contracts as the solution to all problems is dangerous. Dealing with countries with different legal systems entails greater care in the preparation of the initial contract. A publication, "The General Conditions for the Supply and Erection of Plant and Machinery for Export," prepared under the auspices of the U. N. Economic Commission for Europe, has been found satisfactory by purchasing officers in Great Britain and is readily accepted by most manufacturing firms, relates Mr. Blinch. Nevertheless, he cautions, rigorous examination of contracts negotiated with unfamiliar suppliers is extremely important.

The International Chamber of Commerce is usually accepted as an arbitrator in disputes, observes Mr. Blinch.

Another tip: The place of jurisdiction can be another complicated and expensive pitfall if it is not clearly specified in the contract.

The method by which payment will be made must be agreed upon at the time of the contract. Agreement on who is to meet charges incurred, notably freight and insurance, should also be made at this time.

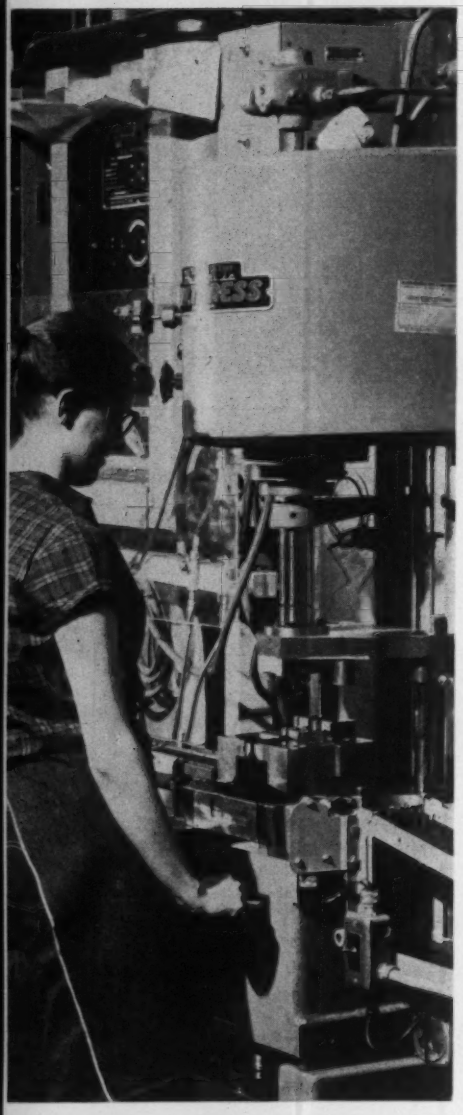
Mr. Blinch recommends "Trade Terms," a guide published by the International Chamber of Commerce. It clarifies common trade terms and summarizes rights and obligations of contracted parties which have been adopted in 18 leading trading nations.

Buyers' Responsibilities When Purchasing Abroad

1. Bear all risks from the time the goods have passed the ship's rail at the port of shipment.
2. Bear all risks and additional charges incurred by failing to notify shipper of time limit or port of destination, if the seller has met all other obligations in the contract.
3. Bear expenses involved in procuring certificate of origin, consular invoice, and other necessary documents.
4. Bear supplementary insurance expenses against risks which he has requested the seller to cover and are not included in the seller's obligations.
5. Pay the sum due on documents presented if they are in accordance with the terms of the contract.
6. Make payment in accordance with the terms of the contract even before receipt and examination of goods.
7. Pay any freight unpaid by the seller, subject to deduction from the invoice, if the seller has not made allowance in his invoice for the unpaid freight.
8. Bear the costs of unloading, including lightering and dock charges, at the port of destination, unless such charges are included in the freight.
9. Bear all expenses incurred by reason of emergency during transport until their arrival at the port of destination.
10. Inspect the goods upon arrival and give due notice in writing of his claims within a reasonable time.
11. Bear all expense and risk for any import license or similar document which he may require.
12. Bear the costs of customs clearance, duties, and all other duties and taxes payable at the time and by reason of importation.

Source: Adapted from "Trade Terms," published by the International Chamber of Commerce.

Pressmakers Push for Higher Sales



By stressing new features . . .

- Higher speeds, shorter cycle times that permit higher production rates.
- Automatic work transfer devices that move parts into, through, and out of press.
- Safety devices that detect oversize parts, improperly aligned work, and broken tools.
- Sliding bolsters, automatic die clamping equipment that cut machine downtime when changing dies.
- Numerical control equipment that positions blanks and changes tools.
- Furnishing auxiliary equipment that is necessary to complete production line.

PRESS BUILDERS are banking on technological improvements to bring them out of their two year sales slump. In fact, they may be on their way now.

Shipments dropped to a low of $76.5 million in 1958, then climbed to $84.6 million last year. It now looks as if 1960 may be a $110 million year.

In the first half, builders shipped presses valued at $53.6 million. It will take less than a 10 per cent increase in shipments in the second half to reach the $110 million mark.

The industry expects to see a steady increase in sales next year. Presses that will be shipped in 1961 have already been ordered. A STEEL survey (Aug. 29, p. 146) showed that second half orders for forming presses were expected to outpace first half orders by 9 per cent, extruding presses by 10 per cent, and other forming machines by 11 per cent.

• **More Speed**—As with machine tools, many press replacement programs are underway throughout metalworking.

But, generally, replacement isn't a 1:1 proposition. Reasons: Speeds are higher; cycle times are shorter; maintenance and setup downtime has been drastically reduced. In one case, a radio equipment manufacturer replaced seven older presses with one new unit equipped with automatic feed and progressive dies.

There's little demand for the one die, single station, standard press. Users want machines that are built for multiple purpose operations and can handle a wide variety of parts.

Many machines are being designed as a production package. All auxiliary equipment, including work handling devices to move parts into, through, and from the press are furnished by the press builder.

• **Less Handling**—Pressmakers are offering automatic groups of presses with work transfer devices and automatic control. The setup allows users to get greater speed from the equipment and eliminates the need to have one operator per machine.

Cycle times on today's presses are a fraction of what most users have been working with. At The Machine Tool Exposition—1960, one builder had a press running at 1000 strokes a minute, turning out shoe buckles on a three station, progressive die. Production: More than a million parts a day. Another pressmaker ran a machine at 1200 strokes a minute.

• **Less Maintenance**—Today's machines can be made almost maintenance free. Rugged frames with-

Press Shipments

	(Millions)
1956	$240.3
1957	$238.7
1958	$ 76.5
1959	$ 84.6
1960*	$110.0

*Estimated by STEEL.
Source: Commerce Department.

stand the shock and vibration of heavy duty stamping. Slides are reinforced to give greater accuracies and protect dies. Moving parts are enclosed and lubricated from continuous recirculating systems.

Electronic and mechanical safety devices are interlocked into the press to detect oversize parts, improperly aligned parts, and broken tools. They protect valuable dies and other tooling and reduce scrap. Less dependence is being put on the operator.

Sliding bolsters and automatic die clamping equipment can cut machine downtime for die changing drastically.

Improved processes like cold extrusion are being made possible through combination of special tooling and press equipment. The auto industry, one of the biggest future markets for the press builder, is buying extrusion presses to replace some screw machine and forging processes.

Numerical control is gaining acceptance in perforating and may soon cross into other fields. One builder is putting out a turret punch press with numerical positioning control and automatic tool changing. The unit uses standard punched tape.

Rails Get O.K. to Raise Rates 1%

U. S. RAILROADS have been granted a 1 per cent over-all freight rate increase by the Interstate Commerce Commission to help defray rising operating costs.

Specifically, they can now add 0.5 cent to rates which have been 65 cents or less per 100 pounds and add 1 cent to rates which have been above 65 cents per 100 pounds.

In addition to the over-all increase, some of the roads' other requests for increases were granted pending further investigation and a few were suspended. They affect special services and certain commodities.

Included in such provisional grants:

- A 2 per cent average increase on shipments of bituminous coal.
- An increase of 11 cents per gross ton on shipments of iron ore.
- A raise in switching rates of $7.50 per car in most places and $3 per car within industrial plants.

The commission ordered the carriers to submit lower proposed increases on combination rates (shipments combining several types of carriers or stopovers) and petroleum coke shipments (increase limited to 7 cents a net ton).

Suspended for seven months until May 23 are proposals to reduce free time at ports to five days, fix a minimum charge of $60 a freight car, charge rent on railroad-owned cars in plant service, and raise charges on third transit stops.

Electroshaping May Ease Machining of Tough Metals

ELECTROSHAPING may make it easier to machine many of the hard, tough, and heat resistant materials. The process, Sifco Shape, was announced last week by Steel Improvement & Forge Co., Cleveland.

In principle, the process works like other electrolytic systems: The work is made the anode. The tools are cathodes. An electrolyte circulates in the gap between the work and the tools, and an electric current erodes the metal from the work surface.

• The process uses relatively high currents to reach good production rates.

One limitation to machining rates is the speed at which dislodged metal particles in solution can diffuse away from the metal surface. In Sifco Shaping, fixture designs permit the exchange of the used chemical solution rapidly enough to support an electric current flow of up to 1500 amperes per square inch (200 to 500 amperes is the common range). Metal removal can be done at rates of 0.05 to 0.1 in. a minute, instead of the 0.00027 to 0.0004 in. a minute that's common in electroplating or electropolishing, says the company.

The contour on the workpiece is generated by the matching shapes on the electrodes (cathodes). With the electrolyte flushing between the electrodes and the work, the electrodes feed toward the work as the machining progresses, generating the final shape on the workpiece.

• Airfoils on jet engine turbine and compressor blades are being produced.

Aubrey H. Milnes, executive vice president, says: "The development had its inception in research work carried out at Battelle Memorial Institute, Columbus, Ohio, under the sponsorship of Steel Improvement. It has progressed to the point where we have produced in excess of 15,000 blades of 16 different designs."

Mr. Milnes says the process not only is less expensive than previous methods but that it also provides the potential for greatly improved dimensional accuracy. Leading and trailing edges as thin as 0.005 in. are practical. Blade materials being shaped include: Both pearlitic and austenitic grades, S-816, Waspalloy, Udimet 700, Nimonic, A-286, and V-57. Tungsten and molybdenum are being worked for other jobs.

• In addition to contour shaping, the electrolytic process can be adapted to other machining operations.

"It's possible to duplicate all the common metal shaping operations in use today," says Dr. Cloyd A. Snavely, general manager of Sifco Metachemical Inc., an affiliate of Steel Improvement. He cites turning, form grinding, internal shaping, milling, sawing or cutoff, broaching, and deep hole drilling as examples.

In one case, on a forging die that takes 7 to 10 hours by conventional machining, the Sifco process took 50 minutes.

The electroshaping machines, built at Steel Improvement's subsidiary company, Custom Tool & Mfg. Co., will be tailored to applications.

Soviets Step Up Foreign Aid...Will Nixon Seek National Sales Tax?...SBA Relaxes Small Firm Loan Requirements

Where 5025 Soviet Bloc Technicians Are Operating . . .

SOUTH AMERICA		**AFRICA**	
Argentina	50	Egypt	525
Brazil	20	Ethiopia	20
Chile	5	Ghana	30
		Guinea	50
EUROPE			
Yugoslavia	10	**ASIA**	
		Afghanistan	1025
MIDDLE EAST		Burma	65
		Cambodia	175
Iran	20	Ceylon	45
Iraq	300	India	1170
Syria	505	Indonesia	75
Turkey	95	Nepal	25
Yemen	810	Pakistan	5

A BIG PROBLEM that'll face the next President is the economic challenge of the USSR, its satellites, and Red China. State Department sources reveal that 5025 (see above) industrial, agricultural, and other Red specialists are already on the job around the world. About 40 per cent work on industrial installations; another 25 per cent are prospecting for minerals. They have one common job: Show the best side of the Soviet system to the underdeveloped nations. The remaining 35 per cent specialize in subversive activities.

Since 1953, the Sino-Soviet Bloc has obligated $3.8 billion for its foreign aid program vs. the $20.3 billion obligated by the U. S. In 1960, the Communists will probably spend more than $1 billion; most of the money will come from the USSR.

Soviet interest rates on loans to underdeveloped countries usually run no higher than 2.5 per cent per annum; repayment terms are long and easily modified. Repayment in commodities is common.

● **NEW DRIVE IN LATIN AMERICA, AFRICA**—A $100 million line of credit with Cuba (for industrial and agricultural machinery) and deals with Ethiopia and Guinea in the last year symbolize the Soviet Bloc's drive in our hemisphere and in the awakening countries of Africa.

A $100 million line of credit with Argentina has resulted in $32 million worth of Russian petroleum industry equipment being sold there. About $50 million worth of railroad, road building, and electrical generating equipment will be delivered under the same deal. The Argentine State Railway has bought 80 motor coaches from Hungary. Brazil has a three year, $200 million deal with the USSR. Hungarian combines and East German automotive machinery are also purchased.

Cuba has received the most attention recently; many specialists have been sent there. The State Department says the USSR will plan, supervise, and manage new plants that'll be established in Cuba between 1961 and 1965. Farm machinery is a major item to be delivered this year.

In Ethiopia, the Russians are building an oil refinery and a gold ore dressing plant and doing surveys for future projects. Guinea, a major target for the Communists, is receiving highway construction machinery; work is underway on a stadium, a railroad, an airport, and a cement plant.

● **PROXMIRE SEES A NIXON SALES TAX**—Sen. William Proxmire (D., Wis.), a fiery liberal, accuses Vice President Richard Nixon of proposing a national sales tax. The idea has long been kicked around in inner administration circles, and at one time or another several highly placed Republicans have made statements which sounded as if they might endorse the idea. Former Commerce Secretary Sinclair Weeks was one. Vice President Nixon wants federal excise taxes broadened to cover more products, but, as yet, he is not specific on a sales tax.

The Democrats argue that a sales tax puts the burden on the person least able to afford more taxes, the low paid workers, the unemployed, and the like.

● **SBIC RULES EASED**—The Small Business Administration is making it easier for small firms to obtain funds through the Small Business Investment Company Program. A new definition of a small business for the purpose of receiving loans will be used: Together with its affiliates . . . a small firm is one which is independently owned and operated . . . is not dominant in its field . . . does not have assets of more than $5 million, nor net worth of more than $2.5 million . . . and does not have an average annual net income, after federal income taxes, of more than $250,000 for the preceding two years. The income limitation was an average of $150,000 for three years. SBA also removed restrictions against financing small firms whose securities are traded.

EX-CELL-O CONTOUR PROJECTORS GIVE YOU MORE—

1. **LARGEST WORK AREA**—Regardless of magnification there is a constant eight inches of work space from lens to focal plane to accommodate large objects. The Model 30 has a 12" diameter capacity.

2. **UNSURPASSED ACCURACY**—Kodak optics with famed Ektar® lenses guarantee accurate measurements and give clear undistorted images over entire screen. You can depend upon optical decisions made on the Ex-Cell-O.

3. **TRUEST MEASURING PRECISION**—All Ex-Cell-O Contour Projectors read to tenths and measure to tenths. Each Ex-Cell-O contour projector is tested and checked to the highest laboratory standards before shipping.

4. **BRIGHTEST GLARE FREE SCREEN**—Coated lenses and mirrors have been standard on all Ex-Cell-O models for many years. The patented "Fresnel" lens (exclusive with Ex-Cell-O) brings entire screen into clear view from normal operator position. Sharp clear images in normal room light—the brightest and clearest in the contour projector field!

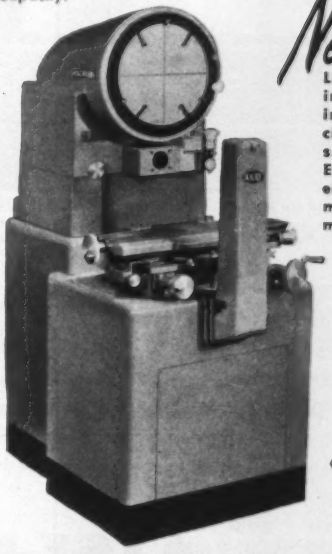
5. **MOST RUGGED CONSTRUCTION**—Built to "stand the gaff." Solid construction with optical system locked into lifetime cabinets. Will withstand factory wear and tear—without getting out of adjustment. Guaranteed by Ex-Cell-O's long experience in the manufacture of precision machine tools.

6. **SIMPLEST OPERATION**—Finger tip controls, cool to the touch lamphouses, simple setting and measuring devices, unreversed images, all add up to comfortable day long operation. A precision machine of great accuracy that can be quickly mastered by average factory inspection personnel.

MODEL 30
A True, Heavy Duty Precision Measuring Projector with 30" Diameter Screen, and 12" Diameter Capacity.

New! **The Ex-Cell-O Mercury Arc Light Source Accessory. A high intensity Accessory light source including Mercury Arc Lamp, special collimator and auxiliary power supply. Quickly adaptable to all Ex-Cell-O Contour Projector Models (except Model 8) to give maximum screen brightness at higher magnifications.**

Write for new booklet "See The Savings" which graphically demonstrates time savings through optical gaging over conventional methods.



MODEL 14-5
The Finest, Most Versatile, 14" Screen Contour Projector Available.

Manufactured by EX-CELL-O Corporation of Detroit, Mich.

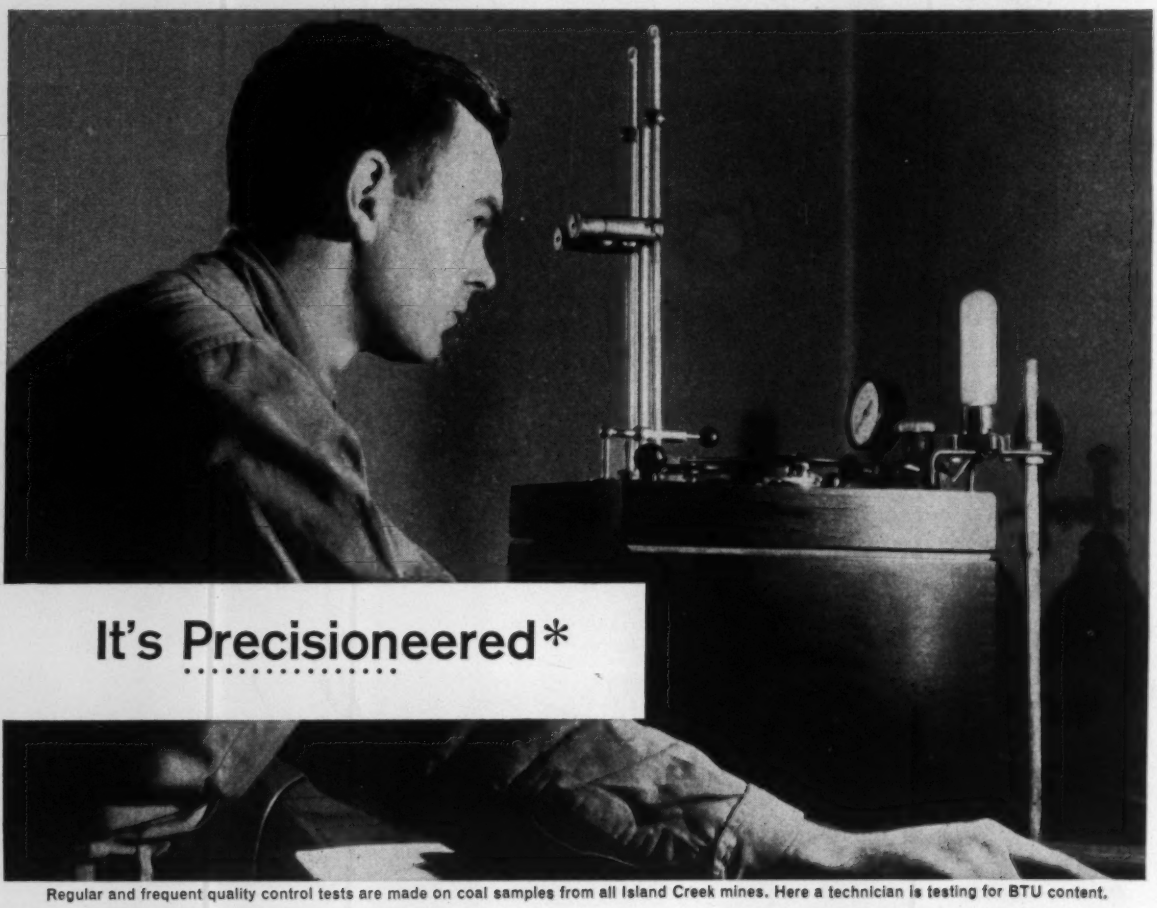
SOLD AND SERVICED BY

OPTICAL GAGING PRODUCTS, INC.

26 FORBES STREET ROCHESTER 11, N. Y.

(A subsidiary of EX-CELL-O Corporation)

How is it possible for Island Creek coal to lower the cost per 1000 pounds of steam? . . .



It's Precisioneered*

Regular and frequent quality control tests are made on coal samples from all Island Creek mines. Here a technician is testing for BTU content.

* PRECISIONEERING is a chain of controlled events that actually begins and ends at your burning equipment. It starts with the question: What kind of coal does your equipment require to produce steam at the lowest net cost per 1000 lbs.? It provides the answer, through penetrating engineering and evaluation studies. It produces the answer . . . with superior seams of coal prepared exactly to your determined specifications in modern preparation plants, using precision engineering techniques and strictest laboratory controls. We'd welcome a chance to discuss the possible reduction of your net costs through Precisioneering. Write. Or phone. No obligation, of course.

P.S. TO COKING COAL BUYERS
Island Creek Precisioneered Coking Coals can help you produce more hot metal per square foot of hearth area.

ISLAND CREEK
Precisioneered Coal

You can depend on Island Creek . . . a career company dedicated to coal

Island Creek Coal Sales Company, Chafin Building, Huntington 18, West Virginia • Chicago • Cincinnati • Cleveland • Detroit • Greensboro • New York • Pittsburgh

LUXEMBOURG:

Small but Mighty

ALTHOUGH a dwarf compared with the area of neighboring countries, the Grand Duchy of Luxembourg is a giant industrially.

About the size of Rhode Island, Luxembourg (population: 322,000) is strategically located at the junction of Belgium, France, and Germany. More than 120 million people live within a 250 mile radius of the duchy, which is served by a highly developed rail and highway system.

It is a steelmaker with rich iron mines providing enough ore for both domestic consumption and export. Nearly 3.7 million tons of steel were poured last year, with light and heavy sections and strip being the major rolled products. More than half the country's gross national product is derived from mining and manufacturing. About 80 per cent of its industrial production and 95 per cent of its steel output are exported. Thus, Luxembourg has the highest value of exports per capita of any nation in the world.

Many firms are finding Luxembourg, which is a member of the European Common Market, a profitable base for their European operations. No restrictions are placed on foreign ownership or management. Corporate income tax is progressive. The rate on earnings over $26,248 is 40 per cent. A municipal business tax amounts to about 8 per cent and property taxes of 0.5 per cent of fixed assets are assessed.

Pure holding companies pay a nominal duty to the Registration & Stamp Duty Office, but are exempt from all taxes. A Luxembourgian firm can be regarded as a holding company if its sole objective is participation in other Luxembourgian or foreign firms. It may manage and aid technically and financially, but cannot engage directly in industrial or commercial activity.

The Luxembourg Board of Industrial Development, New York, reports that the minimum monthly wage for male employees is $91.60 a month with an average wage of 74 cents an hour in metal manufacturing. Employer charges for hospitalization and health, retirement, accident, and family allowances range between 18 and 25 per cent of the insurable wage for all employees. Employers do not contribute directly to unemployment compensation.

Run by a hereditary monarchy responsive to universal ballot, Luxembourg hasn't had an internal political upheaval since 1839.

Foreign Trade Zone at Toledo

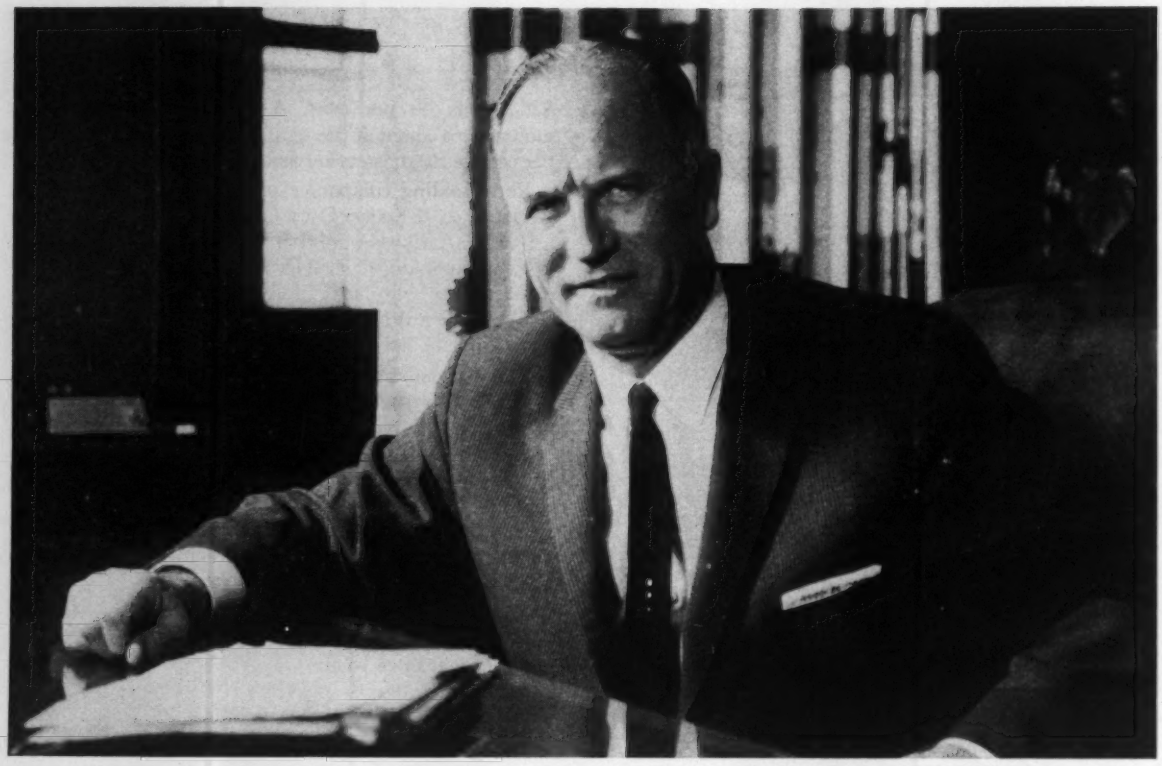
Toledo, Ohio, has been established as the site of the first foreign trade zone on the Great Lakes. A foreign trade zone is an area set apart in a port of entry within the U. S. or its territories. Foreign merchandise may be brought into such a zone with relative freedom from customs laws and may be stored, exhibited, mixed with domestic merchandise, manipulated, or manufactured with no duty paid until the finished product is entered into the customs territory of the U. S.

World Trade Seen More Competitive

Although the U. S. has taken a larger share of world exports of manufactures this year than last, total world trade has grown relatively little since the first of the year, even though production and incomes in the industrial world have continued gaining. Some observers believe this is a sign that the export business will become even more competitive than it is now. Reason: "Automatic" or "natural" growth of foreign markets may be diminishing.

British Steel Output Rebounds

British steel production snapped back in September when output averaged 481,000 tons a week against the weekly average of 422,900 tons in August and 426,400 a year ago, to give an annual rate of better than 25 million tons . . . The Japanese Ministry of International Trade & Industry has announced removal of import restrictions on 77 iron and steel products and machinery.



'People Are Our Biggest Assets'

"I DON'T get excited over assets. I get excited over men, abilities, and talents," says Walter C. Hasselhorn, president of Cook Electric Co., Chicago. "We compare our philosophy to that of a motion picture studio, where stars are the main asset and where talents are the principal source of income."

That philosophy has paid off handsomely for the firm that was founded in 1897 to manufacture telephone equipment. In 1939, it had sales of $350,000. By fiscal 1960, they were close to $43 million.

Thanks to its "stars," Cook is realizing about 25 per cent of its current sales via R&D contracts for government and industry; and much of its growth in manufacturing has stemmed from such activities.

"Growth can be achieved by the orthodox methods of establishing and developing acceptance of new products and through the acquisition of other companies, (but it can also) be built upon individuals and their talents," explains Mr. Hasselhorn. "That has been the theme of growth at Cook."

• Cook's R&D effort began during World War II.

"We became a prime contractor with the Signal Corps, producing telephone equipment," relates Mr. Hasselhorn. "We were approached by another company asking if we could weld Monel bellows. This project, we believe, was the beginning of our technological growth, since we were told by two other firms that it could not be done. We delivered the first leaktight, leakproof Monel bellows on Thanksgiving Day in 1944."

With that accomplishment, Cook became important in the manufacture of bellows, and out of that activity grew its Magnilastic Div.

Concentrated R&D efforts were started with the establishment of Cook Research Laboratories. Some of the early projects included parachute research and development, upper atmosphere studies, and long term gas storage and preservation, says R. C. Edwards, vice president.

(Today, Cook Research Laboratories is one of three activities operating at the Cook Technological Center, Morton Grove, Ill. The center, which occupies seven buildings, also includes Inland Testing Laboratories and Cinefonics Inc.)

• Cook has enjoyed steady growth since it organized for R&D.

In 1946, the company undertook to develop and manufacture relays, pressure switches, brain boxes of

How Contract R&D Promotes Company Growth

1. It gives you the opportunity to obtain good and often special engineering talent that can be used elsewhere in the company.
2. It enables you to develop techniques that can be adapted to your manufacturing processes.
3. You often develop new products which can become profitable items for your company.
4. R&D work is often glamorous, particularly when it's for the government. Publicity helps get your name before prospective customers.
5. You should realize some profit.

packaged control systems, and similar devices. Out of that effort grew the Diaphlex Div. to furnish aircraft components.

Supplying components to the aircraft industry required a considerable amount of qualification testing. Recognizing the need for a central test facility, Cook organized Inland Testing Laboratories. Today, as part of the tech center, Inland is said to have one of the largest cobalt 60 sources in the world. It also has a fully automated reliability and environmental test facility.

Advanced Communications Engineering, a division which designs and builds complete communication systems, grew out of Air Mod, the arm of the company which modifies, repairs, and maintains government aircraft.

Air Mod had undertaken the design of a communications network for an Air Force base. When the proper people were brought together to do the job, Cook found it had a new capability. The group was formed into ACE and is currently building communication networks.

Developments in magnetic tape handling equipment on a subcontract for Burroughs Corp. and Sperry Rand Corp. led to the formation of the Data-Stor Div.

"We found that all our divisions were in some form or other serving the nuclear industry, so by consolidating the members of our staff, we organized the Nucledyne Div.," relates Mr. Hasselhorn. Magnilastic Div. was merged into Nucledyne, and, today, that activity builds environmental equipment, Magnilastic expansion joints, missile conditioning components, and does custom fabricating.

Cinefonics Inc. was added to the Cook family in 1957. It provides film production services and technical documentation for other divisions, government agencies, and industrial organizations.

• Cook's R&D activities have figured in many newspaper headlines.

Its tech center developed the first successful nose cone recovery system. The same system was used to recover the Jupiter nose cone that carried monkeys Able and Baker. On Oct. 13, three mice (Amy, Sally, and Moe) were recovered from a nose cone after a ride through space—thanks to the Cook recovery package.

Many programs on parachute design have been conducted. The center has its own wind tunnel. To test parachute recovery systems, the company has also designed and built rocket powered ground test sleds and free flight and rocket powered airborne vehicles.

Although most research contracts have been for government agencies, some significant projects have been completed for private companies.

Examples: A toll road ticket reader for Remington-Rand; research on the problem of hydrant refueling systems for United Airlines; a device for testing steam engine governors for Allis-Chalmers; tape recorders for geophysical prospecting for Sun Oil Co.

Other research areas in which Cook has worked include geophysical and meteorological instrumentation; servomechanisms and automatic control systems; instrumentation for aircraft, ballistic missiles, space vehicles, and advanced weapons systems.

• The future looks good to Cook Electric. Its sales goal is $100 million by 1965.

Jobless Total Drops

Unemployment in mid-September declined to 3.4 million, down 400,000 from the August level, reports the Labor Department.

The decline in unemployment was greater than usual because of an early startup on production of new model autos compared with previous years. That reduced the seasonally adjusted rate of unemployment in September to 5.7 per cent of the total workforce compared with 5.9 per cent in August.

Have you Entered the $1000 Contest?
See Pages 5 and 6.

Japan Needs, Wants U. S. Tools

Its industry is at least 10 to 15 years behind the U. S. in know-how and methods. The potential market is tremendous, but if we are to expand our trade, we must learn more about the Japanese way of doing business

"JAPANESE industry offers an excellent market for high quality, U. S. machine tools, but we must do a better selling job, and we must give better service."

That evaluation was presented last week by Jack Kleinoder, general manager, Volkert Stampings Inc., at the annual meeting of the National Tool & Die Manufacturers Association in Minneapolis. As a member of a U. S. trade mission to that country, Mr. Kleinoder met and consulted with nearly 5000 Japanese businessmen and manufacturers.

Notwithstanding many appearances to the contrary, said Mr. Kleinoder, Japanese industry and production are limited. He explained: By and large, Japanese businessmen are not convinced that they must raise their productivity so they can put their products on the domestic market at a lower price; of course, some are progressive, and others realize that they must change, but they are in a small minority.

• Provide the Knowhow—In the machine tool field, we have an excellent opportunity to expand our sales by sending our best sales engineers to Japan, said Mr. Kleinoder. They need and want U. S. equipment, but we must show them where and how to use it, he emphasized.

Japanese workers are skillful with their hands and have acquired certain skill in running machine tools and productive equipment. But their productivity is low because of limited training and obsolete equipment, he said. The industry is badly in need of modern machine tools and qualified engineers who know how to set them up and instruct operators to run them.

Jack Kleinoder, general manager, Volkert Stampings Inc., spent two months as a member of a U.S. trade mission to Japan

There is a great deal of fear and distrust on both sides because of some bad experiences with "fast buck" operators, said Mr. Kleinoder, but it can be overcome by anyone who does a better selling job. He offers these suggestions:

• Show a greater interest in the market. Commented one large Japanese manufacturer: "We have to go to your machine tool manufacturer and beg him to sell us some machines, and then we have to make all arrangements in connection with credit. European manufacturers are anxious to sell us—they have their sales engineers calling on us regularly, and they also negotiate and extend credit to us."

• Provide long term (seven years) low credit.

• Learn about the prospective customer's requirements, make sound recommendations and deliver and install the equipment to the customer's satisfaction.

• Learn the customs, practices, and beliefs which govern the social as well as the industrial pattern of life in Japan.

• Encourage reciprocal trade visits between the businessmen of the respective countries.

Tool & Die Group Changes Its Name

THE FUSSY, unconventional machining of the exotic metals required for Space Age vehicles has provided a new field—precision machining—for the specialty tool and die makers in recent years.

Last week these specialists gained new status in their industry. At its annual convention, the National Tool & Die Manufacturers Association voted to change its name to the National Tool, Die & Precision Machining Association.

Reporting on business conditions, industry leaders said that a sharp drop in orders occurred during the summer months, following a heavy workload for new tooling for the 1961 model automobiles. Fall business is showing signs of an upturn.

New officers of the NTDPMA for 1960-61 include: President, Harold C. Murdock, vice president, Arrowsmith Tool & Die Corp., Los Angeles; 1st vice president, John D. Dewhurst, president, Arrow Tool Co., Inc., Wethersfield, Conn.; 2nd vice president, E. W. Barnwell, president, Apex Corp., Roseville, Mich.; treasurer, Rolf H. Berg, vice president-treasurer, Atols Tool & Mold Corp., Chicago; secretary, Fred D. Wright, president, Fred D. Wright Co., Inc., Nashville, Tenn.

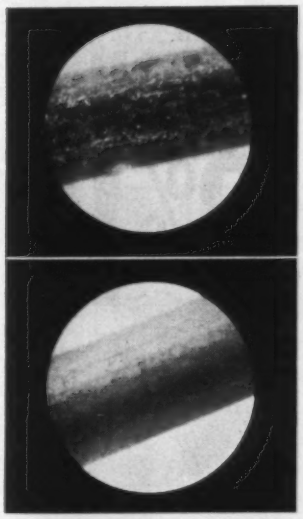
Improved Copper Coating for Wire Increases Coating Adherence, Color Uniformity

AMCHEM CUPRODINE* NO. 5 IS A LOW COST, NON-ELECTROLYTIC COATING FOR LUBRICATING CARBON AND STAINLESS STEEL WIRE, TIRE BEAD WIRE, COLOR CODING AND DECORATING PARTS

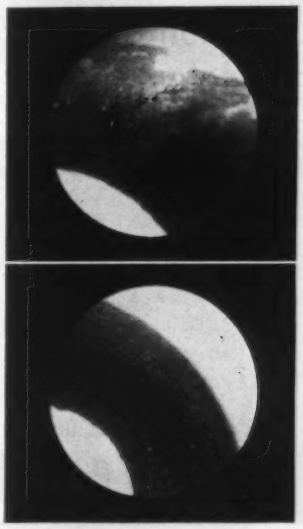
The latest Cuprodine from Amchem provides carbon and stainless steel wire and stampings with a particularly effective and adherent copper coating which appreciably reduces scratching of the wire and pickup and wear on dies during forming.

In treating tire bead wire, the uniformity of Cuprodine No. 5 coatings retained during drawing provide an excellent bonding surface for the rubber. Industry has found wide usage for Cuprodines in color coding parts while the durable and attractive copper coating provides an excellent decorative and protective finish on end products.

Investigate Cuprodine No. 5 for your own particular requirement—it's fast, economical, efficient—requires only simple immersion compared to costly racking and auxiliary equipment needed in electroplating processes.



At top, photomicrograph (50x mag.) of copper sulfated wire after removal of the coating in ammonium persulfate solution. Note heavy corrosive attack and pitting on copper sulfate-treated wire. At bottom, Cuprodine-treated wire subjected to same test.



At top, photomicrograph (50x mag.) shows copper sulfated wire after simple manual bend test. At bottom, photomicrograph shows bend tested Cuprodine-treated wire exhibiting only a slight attack to coating while copper sulfate-treated wire shows heavy flaking of coating.

Another development from Amchem's Metal Protection Laboratories, the pioneer in specialized coatings for 46 years—from the first copper coating without the use of electroplating current, to today's standard in copper coating processes—Cuprodine No. 5.

AMCHEM **CUPRODINE**

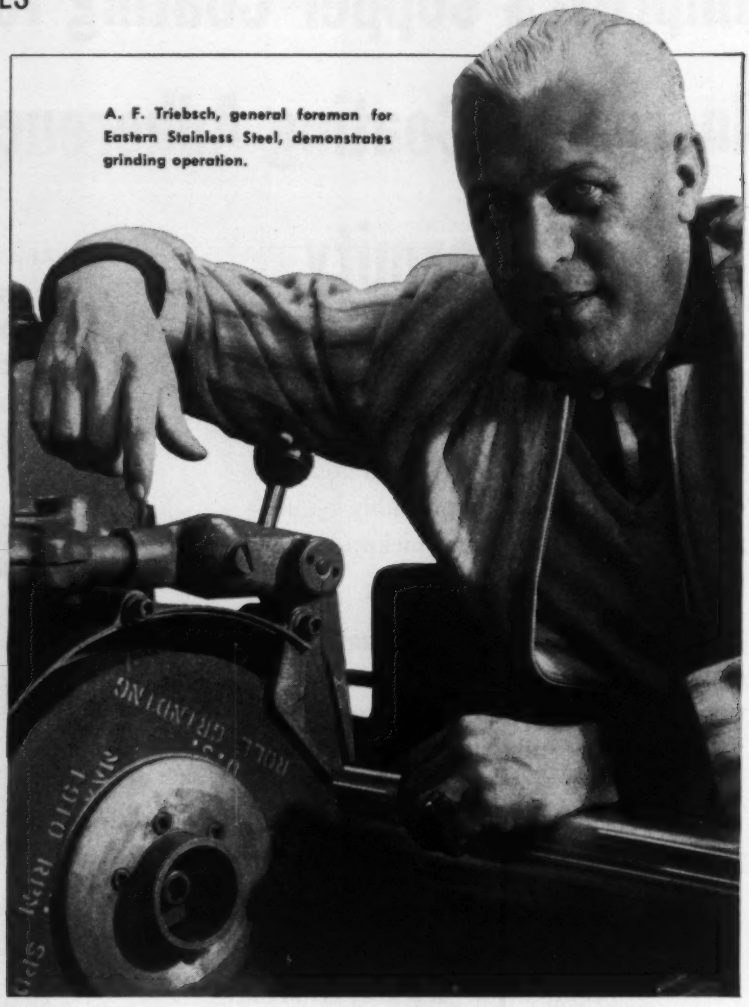
Cuprodine is a registered trademark of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.), **AMBLER, PA.** • Detroit, Mich. St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.

*Amchem's registered trademark for its copper coating chemical.

US RUBBER GRINDING WHEELS

NO CHATTER

Production UP 8%!



A. F. Triebsch, general foreman for Eastern Stainless Steel, demonstrates grinding operation.

"U.S." Grinding Wheels help EASTERN STAINLESS STEEL achieve tolerances of 2/10 of .001" in precision work

In producing stainless steel of great precision, the steel passes through a succession of work rolls under a combined force of 59,000 pounds per square inch. All the rolls must be perfectly round and the tiniest defect must be eliminated. To produce a perfectly flat mirror finish, the rolls have to be 2/10ths of .001" perfect!

This is the kind of work Eastern Stainless Steel Corporation turns out every day. To keep their rolls in perfect balance and symmetry they use "U. S." Grinding Wheels. These amazing wheels allow for no "chatter" or vibration, consequently they never groove the roll. Prior to the use of "U. S." Grinding Wheels, at least an hour a day was lost when the operator had to readjust the machine.

Using "U. S." Wheels, Eastern Stainless Steel found many collateral advantages. Maintenance was reduced by more than 20%. "U. S." Grinding Wheels outlast conventional wheels at a ratio of 4 to 1, an obvious saving of 400%.

You, too, can effect important economies and achieve greater precision by turning your grinding wheel problems over to U. S. Rubber.

US RUBBER

Mechanical Goods Division

United States Rubber

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Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

Engineering Highlights of '61 Cars

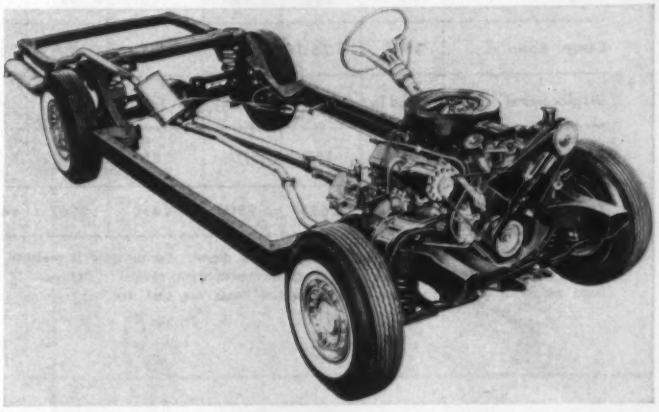
Long life lubrication is one of the most significant improvements on 1961 cars. It vies with aluminum engines and Pontiac's unique Tempest drive line for top billing. But before you start to shop, you'll want to investigate a host of other changes on the new models. Be sure to check last week's issue for 1961 specifications and prices.

Ford and Cadillac have eliminated the need for monthly grease jobs. Cadillac claims its chassis is lubricated for life. Only oil changes and periodic checks of brake and transmission fluids are required. Ford has plugged the regular grease fittings and uses a molybdenum disulfide lubricant that slowly flakes off during use. After 30,000 miles, you take the car into your dealer. He puts on a special fitting, repacks the joints, and replaces the plugs. Then you're set for another 30,000 miles. Cost for repacking is about $4, says one Ford official.

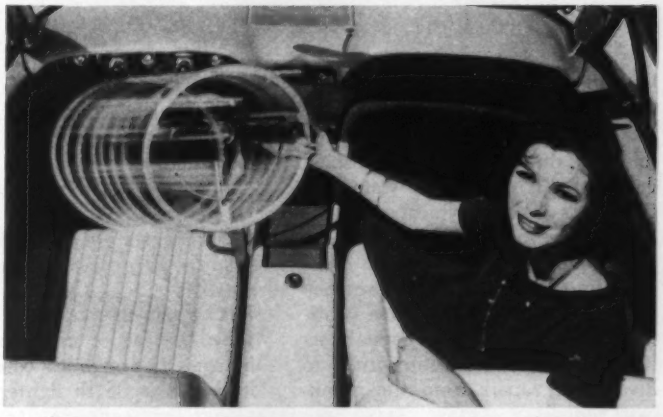
Engines

General Motors' Central Foundry Div. is casting the aluminum blocks and heads for the Buick-Olds-Pontiac (BOP) V-8s at its Defiance, Ohio, plant. Buick machines blocks for all the engines, but Oldsmobile finishes its own heads and assembles different head components. Pontiac also has a modified head design, but the whole package is supplied by Buick.

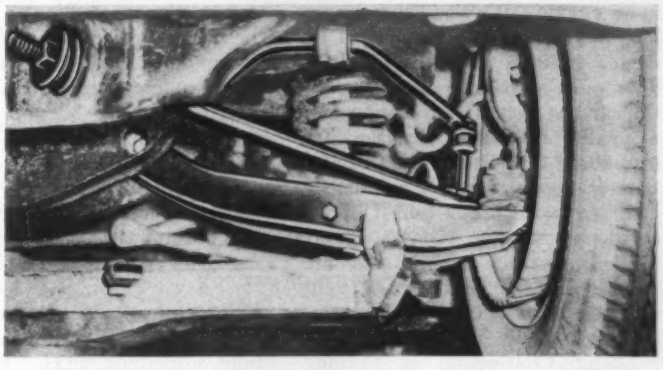
One of the most ingenious parts of the Buick design: A single die-casting integrates the oil pump with the timing chain cover. Gears are housed in a cavity of the cover. The pump cover also serves as the



Oldsmobile's perimeter frame chassis



Thunderbird's swingout steering wheel



Cadillac joints have lifetime lubrication

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1961 Aluminum Engine Specifications

	Buick Special	Olds F-85	Pontiac Tempest*	Corvair	Rambler	Plymouth, Dart, Lancer
Type	V-8	V-8	V-8	Opposed 6	Straight 6	Slant 6
Weight†	105 lb	105	105	80	64	115
Comp. Ratio	8.8:1	8.75:1	8.7:1	8:1	8.7:1	8.2:1
Displacement	215 cu in.	215	215	145	195.6	225
Horsepower	155	155	155	85	127	101
Curb Weight	2732 lb	2695	2800	2415	2967	variable

Source: Alcoa. Rambler and Chrysler car blocks are diecast. Corvair case is pressure molded. Corvair head and BOP blocks and heads are semipermanent molded. * Optional. † Includes head weight if aluminum. Rambler and Chrysler heads are cast iron.

base for the oil filter. Crankshafts are cast from Armasteel.

All companies will supply cars sold in California with an antismog device that's required by state law. Chrysler's unit is typical. Crankcase vapors are routed into the intake manifold. They then pass back into the cylinders where they are consumed. The positive ventilating system requires a special carburetor, valve, and return tube to divert the vapors from the crankcase vent.

Studebaker-Packard has gone to overhead valves on its Lark, six cylinder engine. It's also using a ram manifold. Cadillac has lowered its engine position to make a flatter floor. To provide road clearance, the car has a shallower oil pan and a smaller flywheel. Chrysler has introduced a unique answer to carburetor flooding. Its standard, six cylinder engine uses a rubber tipped needle valve in the carburetor. Dirt particles in the valve seat are pushed into the rubber so a tight seal can be maintained. The particles eventually wash out.

Lincoln-Continental is running an engine reliability program called Select Fits. Main bearings and journals, tappet bores, intake and exhaust valves, connecting rod bore, and bearings are specially matched and fitted.

Drive Lines

Automakers are continuing to cut weight. Ford has designed 25 lb out of its Cruise-O-Matic transmission, which is now vacuum controlled instead of using mechanical linkage. Oldsmobile's compact Hydra-Matic is 95 lb lighter than its regular automatic shift.

Buick has adapted the same split torque principle for its Special transmission that Pontiac uses for the Tempest transaxle. It involves an automatic clutching unit that splits engine torque through the converter, so it's 36 per cent mechanical and 64 per cent hydraulic in high range. Chrysler has developed two, new, manual transmissions with floor shifts. One is for heavy duty with V-8s, the other is slated for Valiant and Lancer.

● **Suspensions**—Mercury now has a double pivoting arrangement for front suspension units. The upper pivot pin compensates for the usual up-and-down movement of the wheel and tire. The second pivot point lets the wheel bounce backward slightly as it encounters ruts in the road.

Buick has eliminated its rear suspension torque tube. It now uses a pair of lower control links running between the frame and a bracket attached to the lower axle housing. An adjustable third link prevents rotation of the housing.

Frames are going outboard at GM. Standard BOP cars have a perimeter (box shape) frame with welded box section construction. It permits lower floor pans and increases headroom without raising the height of the car. Buick's version saves 30 lb on its lower priced lines, 70 lb on the Electra.

Brakes

Ford cars now offer the self-adjusting brake feature that was introduced on the Edsel. Integrally cast aluminum wheels and brake drums are optional on all Pontiacs. Lincoln will offer aluminum drums with cast iron liners for the front wheels of its convertible models. It plated eight, hard chrome spots of the backing plate ledge to make sure the brake shoe returns to correct position.

U. S. Auto Output

Passenger Only	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	434,377	555,410
August	305,527	239,152
September	407,685	258,151
9 Mo. Totals	4,957,167	4,336,725
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
Sept. 24	120,722	91,341
Oct. 1	134,118	105,720
Oct. 8	140,832	118,793
Oct. 15	144,056	133,430
Oct. 22	158,358†	112,488
Oct. 29	155,000*	101,616

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

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$253.50 *in interest alone.* That's what it would have cost our customer to stock the steel for his order of these 5-16" gage tube sheets—had he decided to blank and punch these shapes in his own plant. His plate stock cost would have been $25,350. The interest cost of carrying this for 90 days at—say 4%—is $253.50.

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Please send me your free booklet on Steel Plate Shapes.

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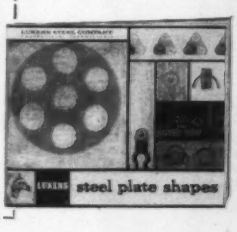


LUKENS

Economy Still High but Slipping

THE BATTLE RAGES on: Are we in a recession? STEEL's industrial production index (below) stubbornly refuses to yield ground, and many highly respected economists and businessmen declare the economy is riding high and steady. But many other business indicators and equally highly regarded economists point to an already deteriorating economic situation which could get worse.

The sides are not even. The recessionists seem to have the edge at the moment, but even they caution that the evidence is not conclusive and that the battle could still go either way. The next two months will probably determine the outcome.

• **Watch Autos**—The most important single sector in this seesaw struggle is the automotive industry. Since the startup of 1961 model production, it has been the main support in most production indexes, including STEEL's. It almost single handedly accounts for the latest rise of 2 points to a preliminary 154 (1947-49 = 100), the highest level since the week ended June 25. The only other strength in the index comes from steady but small increases in railroad freight carloadings and steel production. Electricity output is in a seasonal trough.

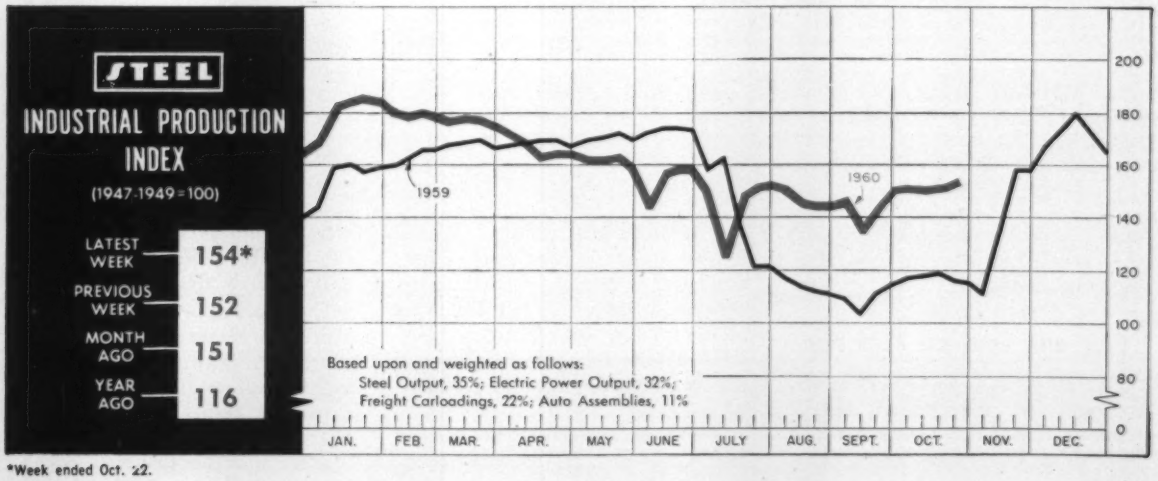
But if word from Detroit is correct, 154 is about as high as the index will go in the second half of 1960. Here's why: Auto officials have had a chance to judge the acceptance of 1961 models. They are not particularly unhappy, but they now have something to go on in adjusting their initial (and overly optimistic) schedules. With more than 1 million 1960 and 1961 new cars in dealers' hands, there is only one way those schedules can go—down. Production was originally pegged at close to 1.9 million units in the fourth quarter; the consensus now: 1.4 million units will be the top figure. Many estimates fall well below that figure. With about 600,000 cars already off the assembly lines in October, you can figure what to expect in November and December. But the slowdown will come gradually, making 450,000 to 500,000 units likely in November and 350,000 to 400,000 in December. A slight dip in sales could make December an even more dismal month.

• **Skids for Steel**—With its main supporter gone, the steel industry would be hard pressed to maintain its present level of operations late in the quarter. Steelmen say that auto demand has been chiefly responsible for keeping operations at the 55 per cent level during this month. And they make no bones about the size of Detroit's inventory. One steelmaker reported that there is enough steel piled up or going through the assembly lines to finish out the year.

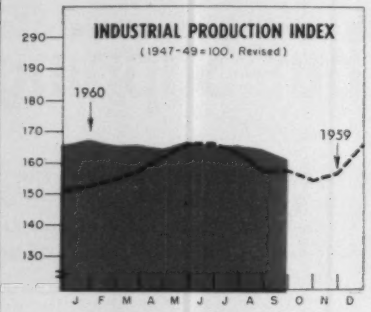
Take away any sizable portion of steel and auto shipments, and you also reduce freight carloadings significantly. And they are scheduled to take a seasonal nosedive when the Great Lakes shipping season closes. That will probably be earlier than usual this year (early November) because of the size of the iron ore piles and the low rate of use.

Such cutbacks also may tend to hold output of electricity in check, although a good Christmas season still could boost the weekly figure close to a record in mid-December.

• **FRB Index Influences**—Many of the holdouts for an upturn changed their minds with the announcement earlier this month that the Federal Reserve Board's industrial production index failed to respond to the automotive stimulus in September. (See graph and table, Page 50.) Among the durable goods industries,



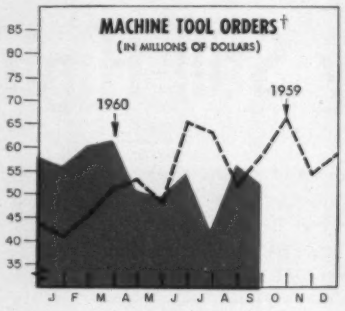
*Week ended Oct. 22.



(Seasonally adjusted)

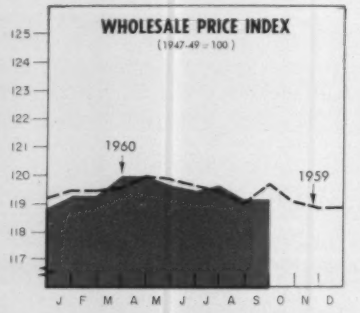
	Total Production		Total Mfg.		Durables Mfg.	
	1960	1959	1960	1959	1960	1959
Jan.	168	152	168	150	181	156
Feb.	166	155	166	153	178	160
Mar.	166	157	165	156	175	165
Apr.	165	162	164	161	172	170
May	167	166	166	165	174	177
June	166	166	165	166	171	178
July	166	163	165	163	172	171
Aug.	165	157	163	157	169	159
Sept.	162*	157	161*	156	166*	157
Oct.	...	154	...	153	...	155
Nov.	...	155	...	154	...	155
Dec.	...	165	...	164	...	174
Avg	...	159	...	158	...	164

Federal Reserve Board. *Preliminary.



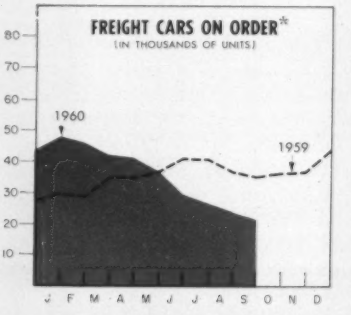
	New Orders (000 omitted)		Shipments (000 omitted)	
	1960	1959	1960	1959
Jan.	$56,450	$41,050	$46,400	$31,300
Feb.	60,600	45,400	51,950	36,050
Mar.	61,950	51,550	64,500	45,750
Apr.	51,850	53,200	55,100	45,000
May	49,950	48,700	56,350	41,000
June	55,100	65,400	63,100	50,050
July	42,950	63,400	51,300	40,600
Aug.	56,850	52,200	47,900	40,300
Sept.	52,350*	58,850	54,300*	46,150
Oct.	.....	66,650	.....	51,500
Nov.	.....	54,250	.....	46,600
Dec.	.....	58,300	.....	63,850
Totals	.....	$658,950	.....	$538,150

†Cutting and forming. *Preliminary.
National Machine Tool Builders' Assn.



	All Commodities		Other Than Farm & Foods	
	1960	1959	1960	1959
Jan.	119.3	119.5	128.8	127.5
Feb.	119.3	119.5	128.7	127.8
Mar.	120.0	119.6	128.6	128.1
Apr.	120.0	120.0	128.7	128.3
May	119.7	119.9	128.2	128.4
June	119.5	119.7	128.2	128.2
July	119.7	119.5	128.2	128.4
Aug.	119.2	119.1	128.2	128.4
Sept.	119.2	119.7	128.0	128.5
Oct.	....	119.1	....	128.4
Nov.	....	118.9	....	128.5
Dec.	....	118.9	....	128.6

U. S. Bureau of Labor Statistics.
Charts copyright, 1960, STEEL.



	Domestic Awards		Backlogs (end of month)	
	1960	1959	1960	1959
Jan.	7,149	4,102	48,170	29,470
Feb.	3,411	1,842	46,323	28,789
Mar.	1,959	10,782	42,131	35,487
Apr.	5,551	3,736	41,003	35,479
May	2,234	5,253	36,106	36,869
June	321	8,369	29,555	40,973
July	1,306	4,159	26,658	40,309
Aug.	1,343	1,653	23,866	37,172
Sept.	2,061	943	21,662	35,626
Oct.	....	2,722	.....	36,199
Nov.	....	2,424	.....	36,555
Dec.	....	10,560	.....	43,870
Total	....	56,495		

*Domestic only.
American Railway Car Institute.

only motor vehicles and parts and the aircraft industries advanced from the August position.

Pros and Cons on Recession

But as Addison T. Cutler, special economist for the Federal Reserve Bank of Cleveland, points out, the FRB index covers only manufacturing, mining, and utilities. It does not take directly into account government spending, construction, services, or trade. "Thus, the index accounts for approximately one-third of the economic coverage of the broader gross national product," he contends.

And there are those who contend that GNP will act counter to the FRB index. Says the National Securities & Research Corp., New York: "We expect final demand for the nation's output of goods and services . . . in the last quarter of 1960 to rise gently above the level of the (third) quarter." (That statement was issued just prior to the announcement last week that third quarter GNP slipped to a $503 billion annual rate.)

George Hitchings, formerly an economist at Ford Motor Co. and now vice president of economic research for American Airlines, declares that there is no evidence that a sharp cumulative decline which presages a recession is developing. He feels that the sharpest adjustment has already been made. Dr. Ezra Solomon, professor of finance, University of Chicago, says that big booms result in sharp corrections and mild booms bring on mild corrections. "We had a sick boom, so we have a healthy recession," he concludes.

Secretary of Labor James Mitchell predicts that employment this month will set an October record. Treasury Secretary Robert Anderson believes the worst part of the economic slide is behind us. And Robert J. Eggert, Ford marketing research manager, sees car sales in 1961 at about the same level as in 1960—close to 6.6 million units. That would not indicate a recession.

Despite all the weighty testimony on the soundness of our economy, there are equally heavy arguments on the other side. After a false upturn in August, housing starts tumbled to what many believe must be the lower limit of 1,077,000 units (annual rate, seasonally adjusted). Consumer spending dipped to $328.5 billion in the third quarter from $329 billion in the second.

The Commerce Department's Business Advisory Council warns that the recession is on and won't be over until mid-1961. Business failures in September reached a post-war record annual rate of 65 casualties per 10,000 listed businesses, reports Dun & Bradstreet Inc.

Even in California, which has escaped the brunt of some recessions, the Los Angeles Chamber of Commerce declares that "the only disagreement seems to be what stage of recession the economy of our country now occupies."

Tool Orders Disappointing

In periods of such uncertainty, many businessmen rely on the so-called leading indicators to give them a clue to future trends. Right now, the indication is for a recession.

Some readers have asked what these indicators are and why they are supposed to forecast business trends. Originally, eight statistical series were set forth by Geoffrey H. Moore and published by the National Bureau of Economic Research. Since then, the list has been modified and expanded by Prentice-Hall Inc., Englewood Cliffs, N. J. (It lists ten.) In the next few weeks, STEEL will explain why these indicators are regarded as trend forecasters.

Net new orders for cutting type machine tools have been one of the most closely watched barometers in the postwar period because they tend to foreshadow downturns. However, they lag upturns in the economy. Here is how they have performed in the last three recessions, using the FRB index as indicative of the general economic trend.

Orders lagged the downturn of 1948-49 by five months, but they led the recession of 1953-54 by 29 months and the downturn of 1958-59 by 20 months. On the other hand, they led the upturn of 1949-50 by three months, then lagged the upturn of 1954-55 (six months) and 1958-59 (four months).

Currently, machine tool orders are in a seesaw pattern (see graph, Page 50), but the level is generally down from the peak of mid-1959. If August marks the beginning of a general decline in the FRB index (which seems to be the case), then the slide in machine tool orders once again led the recession by 13 months. September was supposed to be a big month because of The Machine Tool Exposition—1960. It failed to materialize, adding credence to the contention that machine tool demand is down. (For a more complete analysis of the machine tool market, see next week's issue of STEEL).

Because of the long leadtime shown by this indicator in the last 13 years, plus special circumstances related to the Korean War and the expansion boom of 1955-57, it is doubtful that machine tool orders alone can be correlated as closely as some of the other indicators to the general economic trend.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,516[1]	1,579	371
Electric Power Distributed (million kw-hr)	13,700[1]	13,736	12,762
Bituminous Coal Output (1000 tons)	8,505[1]	8,120	7,970
Crude Oil Production (daily avg—1000 bbl)	6,820[1]	6,824	6,875
Construction Volume (*ENR*—millions)	$400.2	$444.5	$261.7
Auto, Truck Output, U. S., Canada (*Ward's*)	181,802[1]	167,470	139,991
TRADE			
Freight Carloadings (1000 Cars)	655[1]	653	607
Intercity Truck Tonnage (changes from year ago)	−1.4%	+0.7%	+5.4%
Business Failures (Dun & Bradstreet)	326	343	252
Currency in Circulation (millions)[3]	$32,304	$32,276	$32,026
Dept. Store Sales (changes from year ago)[3]	−3%	+2%	+10%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$29,499	$22,014	$27,915
Federal Gross Debt (billions)	$287.5	$288.1	$289.9
Bond Volume, NYSE (millions)	$21.6	$21.5	$26.2
Stocks Sales, NYSE (thousands of shares)	12,932	10,967	13,887
Loans and Investments (billions)[4]	$105.6	$105.9	$102.8
U. S. Govt. Obligations Held (billions)[4]	$27.5	$27.7	$27.4
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	222.2	222.2	226.5
All Commodities[7]	119.0	119.2	119.1
Commodities Other than Farm & Foods[7]	127.6	127.7	128.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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allows flexibility in design with INVESTMENT CASTING

This part is a carrier for a stripper on a citrus peeling machine. It is typical of thousands of irregularly shaped components that are designed with only a particular function in mind and no compromise with production limitations. This type of metal part often requires several changes before the design is finalized.

A late design change in this part, cast in 303 stainless steel, incorporated a 45° bevel, top and bottom on both sides of the serrated pad section. The tooling was altered at very little cost while the cost of the finished casting was not increased at all. The relatively low cost of tooling and tooling changes make the investment casting process an economical and flexible method.

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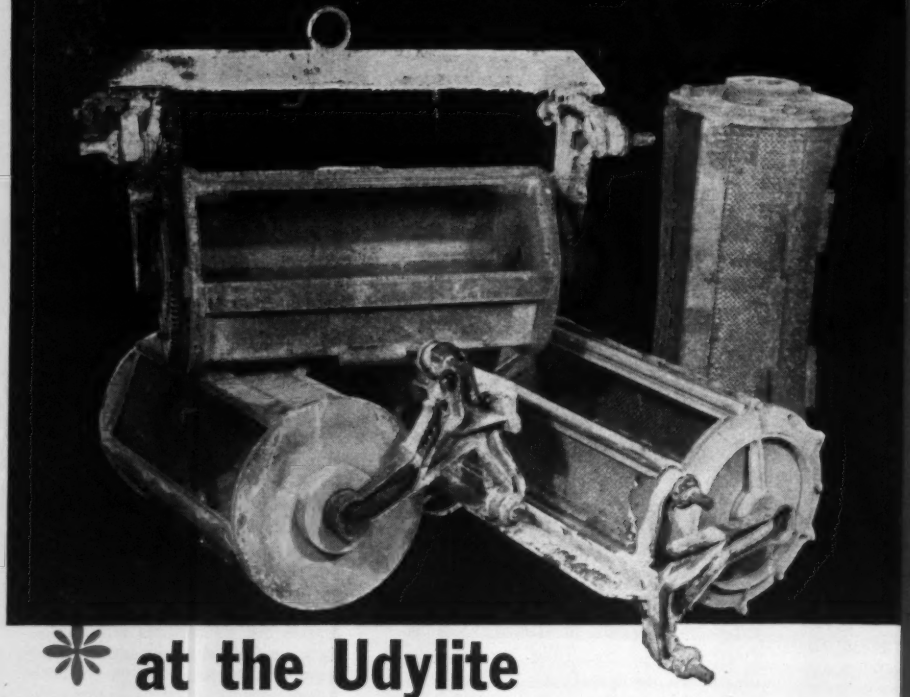
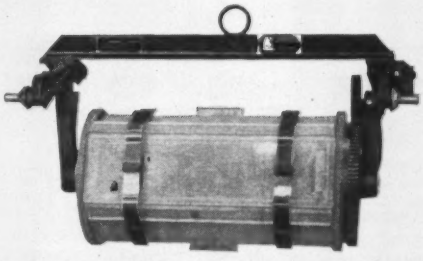


* at the Udylite Project Alert Barrel Program



Hundreds of barrel units have already passed through our Project Alert lines. Every job from the simplest repair to complete renovation has meant equipment salvaged—its useful life extended and real cash savings for plating operators everywhere.

Through Project Alert, barrels in *any* condition are renovated and returned to the line. The program is flexible . . . it provides the exact restoration necessary to put each crippled unit back into productive use. It works! . . . it has proven a valuable economy for hundreds of satisfied Udylite customers.

Get "extra mileage" from your tired, worn out barrel equipment. Ask your Udylite man now or contact Lee Morningstar at Udylite today.

***Lee Morningstar** who personally supervises every single Project Alert Barrel order.*

PROJECT ALERT

world's largest plating supplier

udylite

the udylite corporation

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on the west coast: L. H. Butcher Co.

HENRY J. MAUBERT
J. I. Case v. p.

JOHN S. RANDALL
Kearney & Trecker exec.

FRANK J. NUNLIST
Worthington operations v. p.

RAYMOND C. MILES
Cutler-Hammer div. post

Henry J. Maubert was elected a vice president of **J. I. Case Co.**, Racine, Wis. He is director of procurement, materials, and traffic.

Lawrance W. Wightman was appointed assistant to the vice president-operations, **Emerson Electric Mfg. Co.**, St. Louis. He is responsible for manufacturing research and development for the Commercial Div. Mr. Wightman was with General Electric Co., where he was manager of manufacturing engineering for the Specialty Motor Dept. at Ft. Wayne, Ind.

Charles W. Brunstetter was named manager, Refractory Metals Div., **Ipsen Industries Inc.**, Rockford, Ill. He was vice president of Astrometals Corp., Hawthorne, N. J.

Alan B. Grover was made purchasing agent of **Sperry Products Co.**, Danbury, Conn., division of Howe Sound Co. He joined Sperry in 1948, and has been in the Purchasing Dept. as a buyer since 1953.

John S. Randall was elected executive vice president, **Kearney & Trecker Corp.**, Milwaukee. He succeeds **Ralph W. Burk**, who retired in 1958. Mr. Randall was vice president, industrial products group, A. O. Smith Corp.

Frank J. Nunlist was appointed to the new post of vice president-operations of **Worthington Corp.**, Harrison, N. J. Formerly a group vice president, he is responsible for operations of 16 domestic operating divisions.

John L. Wilkes joined **P. R. Mallory & Co. Inc.**, Indianapolis, as assistant to the president. He was with Ohio Injector Co.

Jules C. Laegeler, former chief engineer, was appointed vice president-engineering, **Frank G. Hough Co.**, Libertyville, Ill. **Keith W. Kampert** was made chief engineer, product design; **Thorvald Granryd** chief engineer, research and development.

Raymond C. Miles was named director of the Engineering & Production Div. of Airborne Instruments Laboratory, division of **Cutler-Hammer Inc.** at Deer Park, N. Y. He has been with AIL since 1950.

Boyd Helm was appointed general manager, Die Div., **Clearing Div.**, Chicago, U. S. Industries Inc. He has been associated with Clearing's Die Div. for the last two years.

W. R. Keough joined **Commercial Steel Treating Corp.**, Detroit, as mechanical engineer, specializing in design and construction of atmosphere furnaces. He was vice president of Michigan Steel Processing and president of its affiliate, Atmosphere Furnace Co.

Paul L. Hotte was named president of **Mallory Metallurgical Co.**, Indianapolis, a division of P. R. Mallory & Co. Inc. He was division general manager.

Paul Ochenas was made general

ALAN B. GROVER
Sperry Products p. a.

JOHN L. WILKES
joins P. R. Mallory

JULES C. LAEGELER
Hough v. p.-eng.

PAUL L. HOTTE
Mallory Metallurgical pres.

ROBERT A. WIELAND JR.

LEONARD R. CERVENIK

factory managers of Eaton divisions

JOHN J. SELWAY

RICHARD H. LANDIS

new posts at Phoenix Steel and subsidiary

sales manager, **Mechanical Air Controls Inc.**, Detroit.

Robert A. Wieland Jr., formerly assistant plant manager, was named factory manager, Marion, Ohio, Div., **Eaton Mfg. Co. Charles D. Barnes**, former purchasing agent, Marion Div., was made divisional sales manager. **Leonard R. Cervenik**, formerly superintendent, Heater Div., Cleveland, was made factory manager. **George Cotter**, former assistant superintendent, was made assistant factory manager, and **John P. Martin** was named superintendent, Heater Div.

Robert C. Craig was made sales manager and technical adviser of **Micro Metals Corp.**, Passaic, N. J. He was with the Metal Powder Div. of Republic Steel Corp.

Waterbury Rolling Mills Inc. promoted **Douglass L. Burnham** to district sales manager, Southern New England and New York State sales area. His headquarters will be at the main office, Waterbury, Conn.

Dr. Arthur F. Earle was elected vice president and secretary of **Aluminium Ltd. Sales Inc.**, New York, sales subsidiary of Aluminium Ltd.

Robert P. Reed was named sales manager, **Carmel Steel Products**, Downey, Calif.

Wendell R. Smith was made staff vice president, marketing development, **Radio Corp. of America**, New York.

William G. Hewitt, assistant to the president, was appointed general manager of the Pacific Div. of **Bunker Hill Co.**, San Francisco.

John J. Selway was appointed general works manager of **Phoenix Steel Corp.'s** recently acquired plant in Claymont, Del. He continues as general works manager of Phoenix' Blast Furnace Div. at Chester, Pa. **Richard H. Landis** was made vice president-sales of the subsidiary, **Phoenix Steel Corp. of Pennsylvania**, directing sales of structural, seamless tube, and plate divisions. He was general sales manager of the Claymont steel plant which Phoenix purchased in September from Colorado Fuel & Iron Corp.

Irvine F. Williamson was appointed superintendent of **Norton Co.'s** Santa Clara, Calif., plant. He assumes his new duties in January after a period of special training at the main plant in Worcester, Mass.

Three general managers of subsidiaries of **Jarvis Corp.** were promoted to corporate vice presidents. They are: **George Carvalho**, machine tool and attachments subsidiary, Middletown, Conn.; **Joseph Brescia**, tap subsidiary, North Attleboro, Mass.; and **Paul Hanscome**, carbide tool subsidiary, Lynn, Mass.

Edward W. Hufnagle was made manager of automotive sales for the Glass Div. of **Pittsburgh Plate Glass Co.** at Detroit. He succeeds the late **W. L. Tomlinson.**

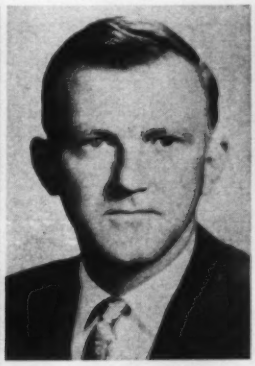
William M. Freeman was made New York district sales manager for **Chicago Bridge & Iron Co.**

Harry W. Fisher, a senior research engineer at **Rockwell Mfg. Co.**, Pittsburgh, was named manager, central liquid meter products engineering.

Kurt J. Schoeps, former manager of the Houston operations of Commercial Metals Co., was named president of **Cometals Far East Inc.**, subsidiary, with headquarters in Tokyo, Japan. **Joseph B. Laman** succeeds Mr. Schoeps at Houston.

Lloyd A. Rager was made manager of the newly established Products Marketing Dept. of **LeTourneau-**

GEORGE CARVALHO



PAUL HANSCOME

JOSEPH BRESCIA

elected Jarvis Corp. vice presidents

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DENISON HydrOILics

JOHNSON MOTORS uses DENISON Multipress to solve die-cast...

TRIM COSTS

FOUR STURDY COLUMNS *accurately guide the Multipress platen and the top half of the trim die. Hydraulic power unit is mounted overhead to minimize floor space and for easy access to the Multipress bed. Operation at Johnson Motors Company, Div. Outboard Marine Corp., Waukegan, Ill.*

SURPLUS MATERIAL *from die-casting operation is accurately, economically trimmed with Denison Multipress from these large aluminum outboard motor castings without damage.*

TRIMMING COSTS had to be considered carefully by Johnson Motors in tooling up for their powerful new 40-hp and 75-hp Sea-horse® motors. Improper trimming would mean scrapping large aluminum castings—seriously boosting production costs.

The Denison 15-ton, Four-Column Platen Multipress—designed after extensive investigation of industry's needs for an efficient die-cast trimming press—was the logical solution. Multipress affords rigid platen guidance . . . adjustable speed controls to suit individual operator skills . . . and the precise, cushioned application of hydraulic pressure to assure *die-cast trimming without costly rejects.*

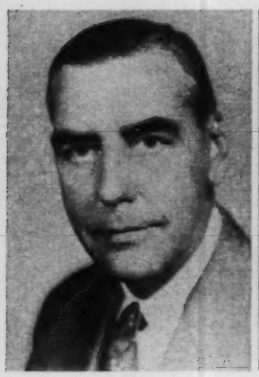
This Four-Column Platen Multipress filled other Johnson trimming press needs, too—large die capacity . . . four-side press accessibility for conveyor adaptation.

An endless range of production jobs are done better . . . for less with Denison hydraulic Multipress—capacities from one to 100-tons. Your Denison Production Specialist can show *you* how with a **M**ultipress **A**nalysis **P**rogram made in your plant now—at no cost, no obligation. It's the first step to **MAP** new savings in *your* production operations.

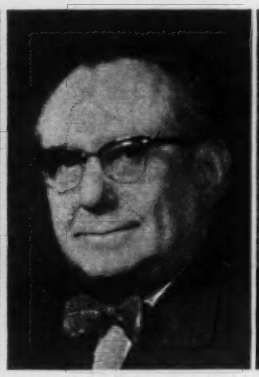
DENISON ENGINEERING DIVISION
American Brake Shoe Company
1180 Dublin Road • Columbus 16, Ohio

HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

DENISON
HYDRAULIC MULTIPRESS



CHARLES E. NELSON JR.
Waukesha Motor president



LEON J. LIEBERMAN
Alan Wood Steel post

WILLIAM G. GEROW
Blackhawk div. manager

STANLEY E. JACKE
Branson-Power Div. v. p.

FRANK A. RYDER
Stewart-Warner v. p.

DR. DONALD W. COLLIER
B-W v. p.-research

Westinghouse Co., Peoria, Ill. He was product manager, Motor Grader Div.

Stanley E. Jacke was named vice president-engineering and research in the Power Div. of **Branson Instruments Inc.**, Stamford, Conn. He was president of Sonic Energy Corp., recently purchased by Branson.

Reactive Metals Inc., Youngstown, named **William G. Fetter** division manager of the Niles, Ohio, plant, formerly a plant of Mallory-Sharon Metals Corp.

Robert C. Main joined **Sperry Products Co.**, Danbury, Conn., division of Howe Sound Co., as manager of engineering, a new post.

Irwin A. Binder returns to Cleveland as vice president, main plant operations, for the Automotive Divisions of **Thompson Ramo Wooldridge Inc.** For the last three years, he served as vice president-manufacturing for the Ramo-Wooldridge Div. in Los Angeles and Denver.

Frank A. Ryder, general manager of John W. Hobbs Corp., Springfield, Ill., division of **Stewart-Warner Corp.**, Chicago, was elected a vice president of Stewart-Warner.

Dr. Donald W. Collier was named vice president-research for **Borg-Warner Corp.**, Chicago. He was president of Thomas A. Edison Research Laboratory Div., McGraw-Edison Co.

Richard R. Mills was elected executive vice president of **Damascus Tube Co.**, Greenville, Pa. He continues to serve as treasurer.

Johnson Bronze Co., New Castle, Pa., named **John J. Brice** vice president-sales, **Thomas S. Acker** manufacturing manager, and **Paul J. Failla** superintendent of machine shops.

R. C. Cash was made Chicago district sales manager for the **Wolverine Tube Div.** of Calumet & Hecla Inc. He was Birmingham district sales manager.

Charles E. Nelson Jr., former executive vice president, was elected president of **Waukesha Motor Co.**, Waukesha, Wis., succeeding **James E. DeLong**, retired. **J. G. Swain** was elected vice president; **L. W. Youker** secretary and treasurer; **N. H. Willis** vice president-engineering.

Leon J. Lieberman was named product manager, floor plate sales, **Alan Wood Steel Co.**, Conshohocken, Pa. He is responsible for marketing and sales.

William G. Gerow was promoted to general manager, **Blackhawk Industrial Div.**, Butler, Wis., Blackhawk Mfg. Co. He was administrative co-ordinator of the division, and recently served as assistant general manager.

Charles F. Brown was made purchasing agent, **Loftus Engineering Corp.**, Pittsburgh, to succeed **F. A. Rahter**, retired.

John J. Sowko was promoted to sales manager-product development, Carbide Div., **Firth Sterling Inc.**, Pittsburgh. **Norman E. Donnelly** was made Pittsburgh district manager, Carbide Div.

Roger B. Yepsen was named manager-marketing research and administration of **General Electric Co.'s** industrial sales administration operation, Schenectady, N. Y.

Arthur E. Hartung was made manager of the Product Engineering Dept. of **Elion Instruments Inc.**, Bristol, Pa. He was manager, special projects unit, Radar Advanced Project Development Dept., RCA Defense Electronics Plant, Moorestown, N. J.

OBITUARIES...

Robert G. Leary, 51, vice president-sales, **Rigidized Metals Corp.**, Buffalo, died Oct. 9.

Burt E. Hoover, 68, vice president, **Lakeside Bridge & Steel Co.**, Milwaukee, died Oct. 15.

A. T. Galbraith, 76, former vice president, **Crucible Steel Co. of America**, Pittsburgh, died Oct. 19.

Fred J. Meyers, director of purchases, **GHR Foundry Div.**, Dayton Malleable Iron Co., Dayton, Ohio, died Oct. 8.

Precisely alloyed,
quality controlled, trouble-free:

FEDERATED "ENGINEERED" SILICON, ALUMINUM & MANGANESE BRONZES

For true-acting bronzes, specify Federated Herculoy Silicon Bronzes (excellent fluidity, tensile strengths up to 65,000 psi, yield strengths up to 35,000 psi); Aluminum Bronzes (tensile strength as high as 120,000 psi, after heat treatment); and Manganese Bronzes (as-cast tensile strength, up to 125,000 psi, exceptionally high hardness). Federated "Engineered" Bronzes are the end results of highly perfected production techniques and continuous quality control procedures developed by experienced metallurgists in Asarco's Central Research Laboratories. For complete data on Federated "Engineered" Bronzes, write or call: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, N. Y., or your nearby Federated sales office.

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Locust 7-5129

PITTSBURGH 24, PENNA.
Museum 2-2410

PORTLAND 9, OREGON
Capitol 7-1404

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Chicago: Essex 5-5000

IN CANADA: Federated Metals Canada, Ltd.
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Montreal, P.Q., 1400 Norman St., Lachine, Phone: Melrose 7-3591

Government Guarantees Power for Steel Plant at Anaconda, Mont.

CONSTRUCTION of a steel mill in Montana moved a big step forward earlier this month when the government signed an agreement to supply the electric power (STEEL, Sept. 28, 1959, p. 81).

Webb & Knapp Strategic Co. plans to build the mill. Its annual capacity: 350,000 tons. Its cost: $30 million to $40 million. The Strategic-Udy process will be used to make steel from iron recovered from copper slag at Anaconda Co.'s large smelter at Anaconda, Mont. Ingots will be shipped to makers of steel products on the West Coast and in Canada.

The Bonneville Power Administration will deliver 120,000 kw to the mill. Half will be turned on July 1, 1963, the remainder by Nov. 1 that year.

Webb & Knapp Inc., New York, holds an 85 per cent interest in Webb & Knapp Strategic Co.; Strategic Materials Corp., Buffalo, has a 15 per cent interest.

Webb & Knapp has contracted to buy (25 cents a ton) the copper slag in a 40-million-ton pile and all future output at Anaconda Co.'s smelter, which adjoins the site of the new mill. Koppers Co., Pittsburgh, is engineering the plant and making economic and market studies.

Installs 18 in. Hot Mill

An 18 in., two high, reversing hot mill has been installed in the Hawthorne Works of Western Electric Co. Inc., Cicero, Ill. It is used to roll 1½ and 2½ in. square billets, as well as various ferrous flats (including one flat 7 in. wide by 0.375 in. thick). The ferrous alloys handled on the mill contain such hard to roll elements as nickel, cobalt, and vanadium. The mill was designed and built by Birdsboro Corp., Birdsboro, Pa.

Expands Refractory Plant

Chemical & Metallurgical Div., Sylvania Electric Products Inc., New York, is erecting a 6500 sq ft addition to its refractory metal processing plant at Towanda, Pa. Capacity is being doubled for production of tungsten and molybdenum sintered products.

Orders Pickling Line

Midwest Steel Corp., a division of National Steel Corp., Pittsburgh, awarded a contract to David W. Murray Co., Cleveland, for the erection of a steel pickling line in the mill being constructed at Portage, Ind. The pickling line contract covers mechanical erection, piping, and complete electrical installation.

Frankel Adds Vacuum Unit

Frankel Co. Inc., Detroit, has installed a new vacuum furnace in its laboratory. The furnace "will greatly improve our quality control and speed development of new products from scrap materials," says T. C. Towler, general manager of production. The firm processes secondary nickel, cobalt, tungsten, molybdenum, titanium, zirconium, and their alloys.

Caster Forms New Unit

Vanadium-Alloys Steel Co., Latrobe, Pa., has organized a Cast-to-Shape Products Dept. to meet demand for tool steel and special steel castings. The department has been manufacturing sand, shell, and Shaw process castings along with combinations of all three for several months. Castings are offered in a wide range of sizes in a variety of alloys melted to customer requirements. Oliver H. Cook is the head of the department.

Bohn Enlarges Foundries

Bohn Aluminum & Brass Corp., Detroit, is expanding its plants in Butler, Ind., and South Haven, Mich., in addition to the recently announced program at its Danville, Ill., plant (STEEL, Oct. 10, p. 114). Production facilities for permanent mold castings at the Butler plant are being enlarged by a plant addition and the installation of additional melting, production, and laboratory equipment. A new engineering building will be added to the South Haven facility where aluminum pistons and castings are made. It will consolidate all of Bohn's piston engineering personnel under one roof.

Expand Foreign Properties

Illinois Tool Works, Chicago, is enlarging manufacturing facilities abroad. IT-S Ltd., a wholly owned subsidiary, has moved into larger quarters at Slough, Bucks (London), England. The parent firm recently acquired a majority interest in Albert Thode & Co. G. m. b. H., Hamburg, Germany. Thode also is enlarging its fastener manufacturing facilities.

Branson Instruments Inc., Stamford, Conn., manufacturer of ultrasonic cleaning and test equipment, formed a wholly owned subsidiary (Branson Europa N.V.) in The Netherlands. R. P. Ruffles is general manager of the subsidiary. A 5000 sq ft factory is being built at Industrieweg 14, Loosdrecht, The Netherlands.

Japanese Firm Licensed

Pennsylvania Engineering Corp., New Castle, Pa., has licensed Kawasaki Dockyard Co. Inc., Kobe, Japan, to manufacture its basic oxygen converters and auxiliaries for installations in Japan, Burma, and the Philippines. The Pennsylvania firm recently made a similar agreement with Ashmore, Benson, Pease & Co. Ltd. of England for installation of the units in the United Kingdom, Europe, Australia, and South Africa.

Installs Plutonium Mill

A heavy duty, high precision, two high-four high combination rolling mill is being installed at the Fuels Technology Center of the Argonne National Laboratory, Argonne, Ill. The machine is completely enclosed in a controlled atmosphere glovebox to allow the processing of alpha-active, phyrophoric, nuclear age materials, such as plutonium. The mill was designed and built by Loma Machine Mfg. Co. Inc., New York.

Twin Coach Buys Division

Twin Coach Co., Buffalo, purchased the Body Div. of York-Hoover Corp., York, Pa., producer of truck bodies, hydraulic and electromechanical devices for utility companies, and electronic equipment shelters. The property will be operated as a subsidiary, York Body & Equipment Co.

Chemical Line Broadened

Michigan Chemical Corp., acquired the anhydrous hydrogen bromide manufacturing facilities formerly owned and operated by the Westvaco Chlor-Alkali Div. of Food Machinery & Chemical Corp. at South Charleston, W. Va. The facilities have been moved to Michigan Chemical's plant in St. Louis, Mich.

CONSOLIDATIONS

Patterson Foundry & Machine Co., East Liverpool, Ohio, reacquired its former subsidiary, **Patterson Foundry & Machine Co. (Canada) Ltd.**, Toronto, Ont., from Ferro Corp., Cleveland. Willard W. Mason is general manager of the Canadian subsidiary.

James Mfg. Co., Milwaukee, purchased **Graham Metal Products Ltd.**, Preston, Ont., producer of poultry and hog equipment. The property will be operated as Jamesway Ltd.

NEW ADDRESSES

Green Steel Co. Inc. moved into its new warehouse and office building at 1825 Kuntz Rd., Dayton, Ohio. The $300,000 structure contains 25,000 sq ft of floor space.

O. L. Anderson Co. Inc. (auto fuel tanks and sheet metal stampings) moved to its new plant at 12400 Burt Rd., Detroit 28, Mich.

Royco Instruments Inc. moved its offices and production facilities to 440 Olive St., Palo Alto, Calif. The new quarters contain 6250 sq ft of floor space.

Norden Div., United Aircraft Corp., moved its Data Systems Dept. to 3501 Harbor Blvd., Costa Mesa, Calif. The move consolidated operations formerly carried on in Gardena and Santa Ana, Calif.

NEW PLANTS

Vulcan-Kidd Steel Div., H. K. Porter Company Inc., Aliquippa, Pa., opened a tool steel service center at 1601 Oliver Ave., Indianapolis, Ind. Ray C. Smith is the district sales manager.

Cutler-Hammer Inc., Milwaukee, has begun operations in its plant at Belmont, Calif. The 35,000 sq ft facility houses the company's manufacturing, sales office, and warehouse activities for the area. The plant produces motor controls and power distribution equipment.

Linde Co., a division of Union Carbide Corp., New York, will build a plant near Houston to make oxygen and nitrogen. The firm will also construct an 8 mile pipeline to carry the gases to customers.

Eutectic Welding Alloys—Southwestern Div. Inc., a subsidiary of Eutectic Welding Alloys Corp., has opened new quarters at 2366 Irving Blvd., Dallas. The parent firm is erecting a 25,000 sq ft, $500,000 addition to its headquarters facilities in Flushing, N. Y.

Clark Equipment Co., Buchanan, Mich., is constructing a second sales and service branch for its Industrial Truck Div. at 111th and Langley Streets, Chicago, Ill.

Jones & Armstrong Steel Co., Birmingham, opened a steel service center at 411 Virginia St., Mobile, Ala. R. E. Sheridan is manager. The branch will handle plates, structurals, bars, pipe, and expanded metals.

Carolinas Virginia Nuclear Power Associates Inc. has started construction of a 17,000 kw generating station at Parr, S. C., that's scheduled to be completed in mid-1962. Westinghouse Electric Corp.'s Atomic Power Div. is responsible for the development and design of the reactor plant and is furnishing equipment for it. The utility group (Duke Power Co., South Carolina Electric & Gas Co., Carolina Power & Light Co., and Virginia Electric & Power Co.) will have an investment of about $28 million in the project. U. S. Atomic Energy Commission's cost will be about $15 million for research, development, and other charges.

Mallory Controls Co., a division of P. R. Mallory & Co. Inc., Indianapolis, is constructing a 140,000 sq ft plant at Frankfort, Ind. Products will include carbon controls, vitreous enamel resistors, power rheostats, switches, jacks, and plugs.

Kohler Co., Kohler, Wis., has opened its new factory for the production of engines and electric plants. The facility contains about 540,000 sq ft of floor area, including 500,000 sq ft working area.

All-Power Machine & Mfg. Co. Inc. will build a $70,000 plant on Weidner Road, Rochester, N. Y. The firm makes sump pumps.

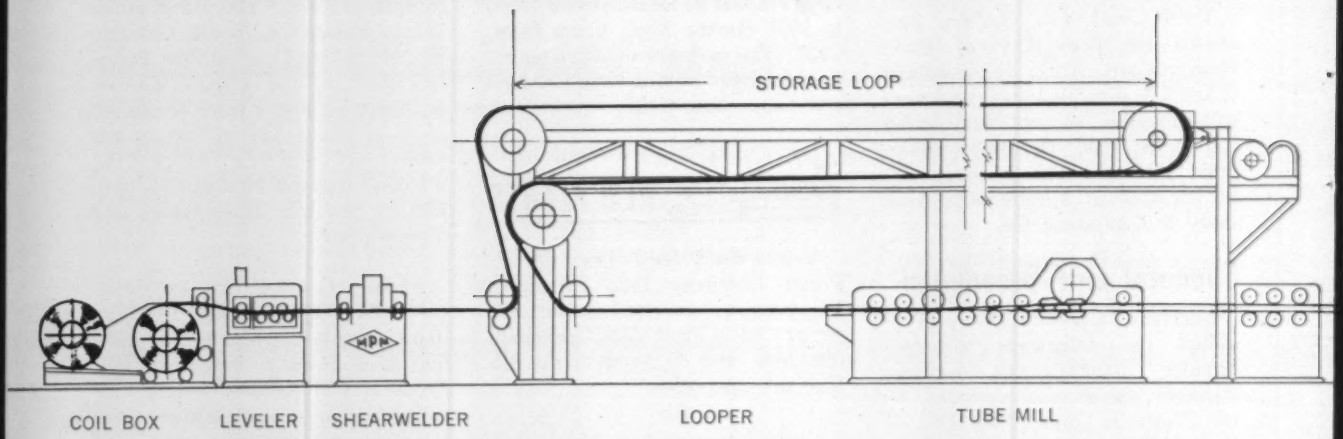
Seco Mfg. Inc. plans to build a plant near Wauseon, Ohio, for the production of fire fighting equipment. Estimated cost: $200,000.

NEW OFFICES

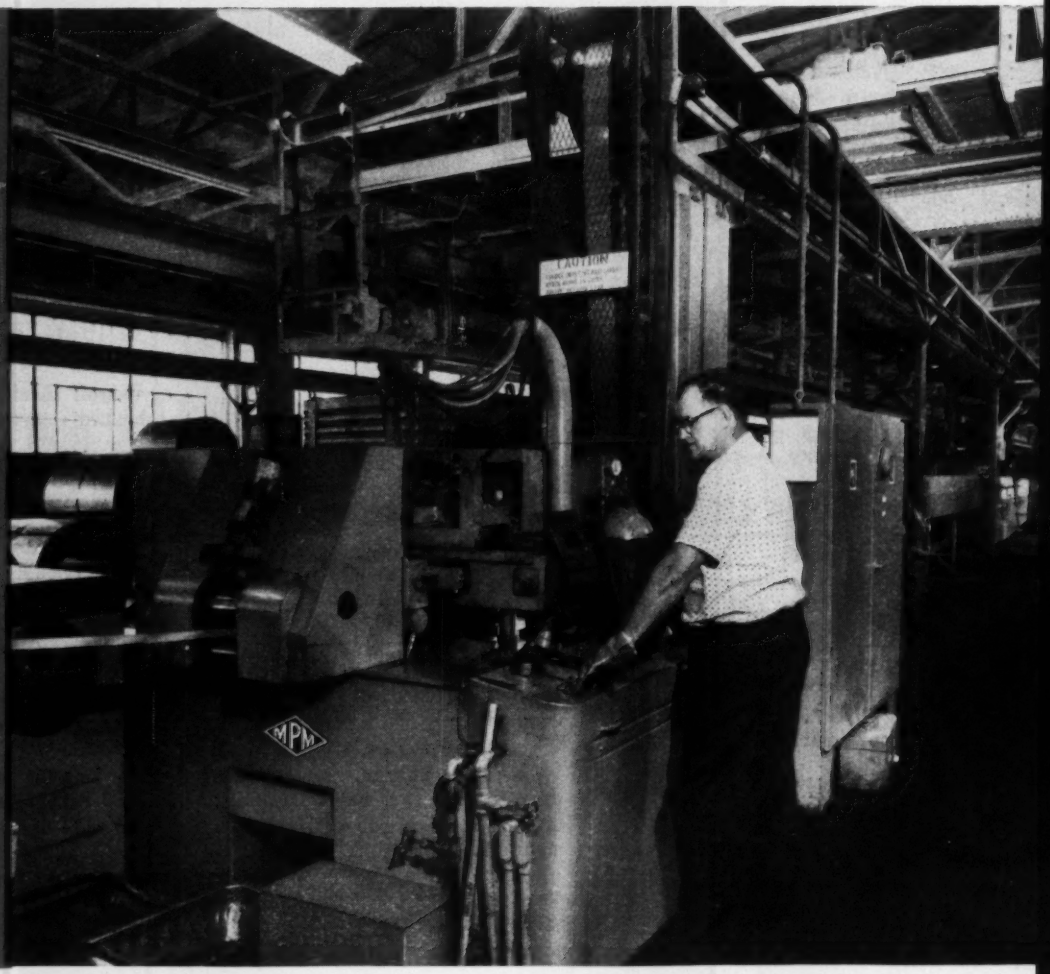
Detroit Steel Corp., Detroit, established a district headquarters office at 351 W. Jefferson Ave., Dallas, Tex. The office is headed by Warren McClelland.

Carborundum Co., Niagara Falls, N. Y., opened a Buffalo district sales office and warehouse at 2475 Walden Ave., Cheektowaga, N. Y. Primary stock will include grinding wheels, bonded abrasives, coated abrasives, abrasive grains, powders, and tumbling media.

Commercial Metals Co., Dallas, established Commercial Metals Co. of Massachusetts at 20 Providence St., Boston, Mass. Sam Nussbaum is manager of the branch. Dick Barron is supervisor of the firm's New England operations. The firm is in the scrap iron and metal business.



Here's the surest and most efficient



One of several MPM Shearwelders at work in the automotive industry. This unit keeps the McKay Tube Mill running continuously, doubling its production and reducing costs by more than $50,000 per year.

THE MPM SHEARWELDER WITH STRIP LOOPER CAN DOUBLE YOUR OUTPUT WITH NO ADDITIONAL LABOR!

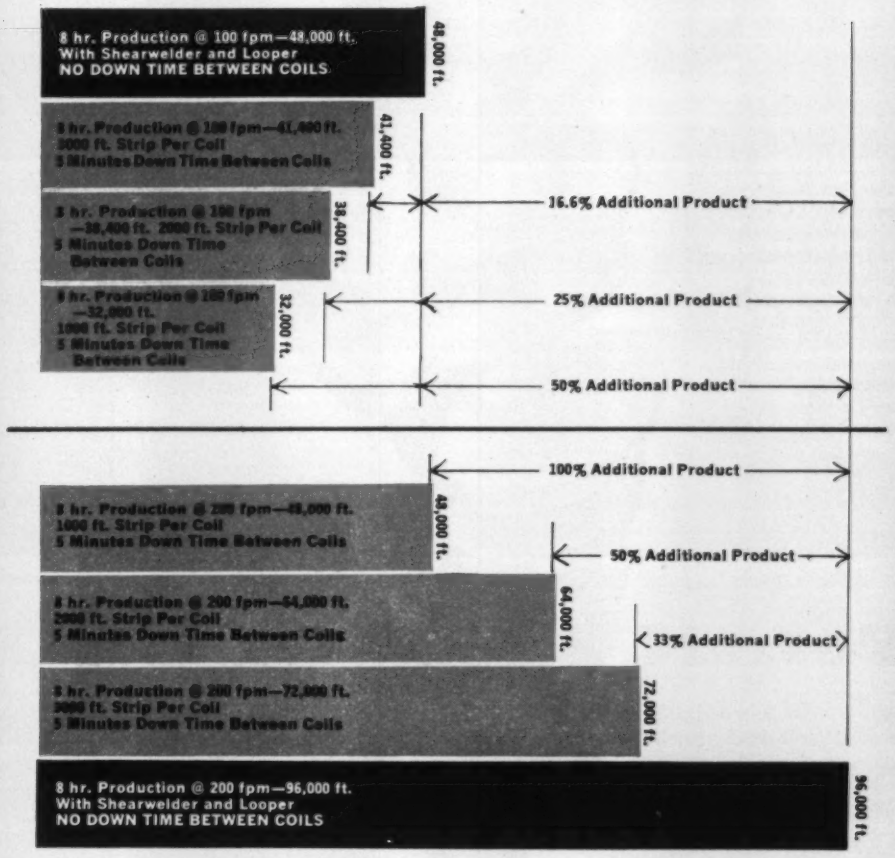
Custom designed to meet space requirements, the MPM Strip Looper is a precision controlled, automatic strip storage device, permitting continuous line operation while coil ends are joined together.

The MPM Shearwelder is the fastest, most accurate and compact machine of its type. It produces positive, ductile, smooth joint welds in ferrous or nonferrous strip which permit subsequent rolling, forming or blanking operations without flash trimming or grinding.

The MPM Shearwelder and Looper will convert your present tube mill into a continuously operating production line. Built-in automation features eliminate the need for skilled labor.

Check the chart below to estimate possible increased production. You are operating in "the red" if you don't use the MPM Shearwelder and Looper.

way to increase tube mill production


8 hr. Production @ 100 fpm—48,000 ft.
With Shearwelder and Looper
NO DOWN TIME BETWEEN COILS
48,000 ft.
8 hr. Production @ 100 fpm—41,400 ft.
3000 ft. Strip Per Coil
5 Minutes Down Time Between Coils
41,400 ft.
16.6% Additional Product
8 hr. Production @ 100 fpm
—38,400 ft. 2000 ft. Strip Per Coil
5 Minutes Down Time
Between Coils
38,400 ft.
8 hr. Production @ 100 fpm
—32,000 ft.
1000 ft. Strip Per Coil
5 Minutes Down Time
Between Coils
32,000 ft.
25% Additional Product
50% Additional Product
100% Additional Product
8 hr. Production @ 200 fpm—48,000 ft.
1000 ft. Strip Per Coil
5 Minutes Down Time Between Coils
48,000 ft.
50% Additional Product
8 hr. Production @ 200 fpm—64,000 ft.
2000 ft. Strip Per Coil
5 Minutes Down Time Between Coils
64,000 ft.
33% Additional Product
8 hr. Production @ 200 fpm—72,000 ft.
3000 ft. Strip Per Coil
5 Minutes Down Time Between Coils
72,000 ft.
8 hr. Production @ 200 fpm—96,000 ft.
With Shearwelder and Looper
NO DOWN TIME BETWEEN COILS
96,000 ft.

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DIVISION OF McKAY MACHINE CO.

MPM

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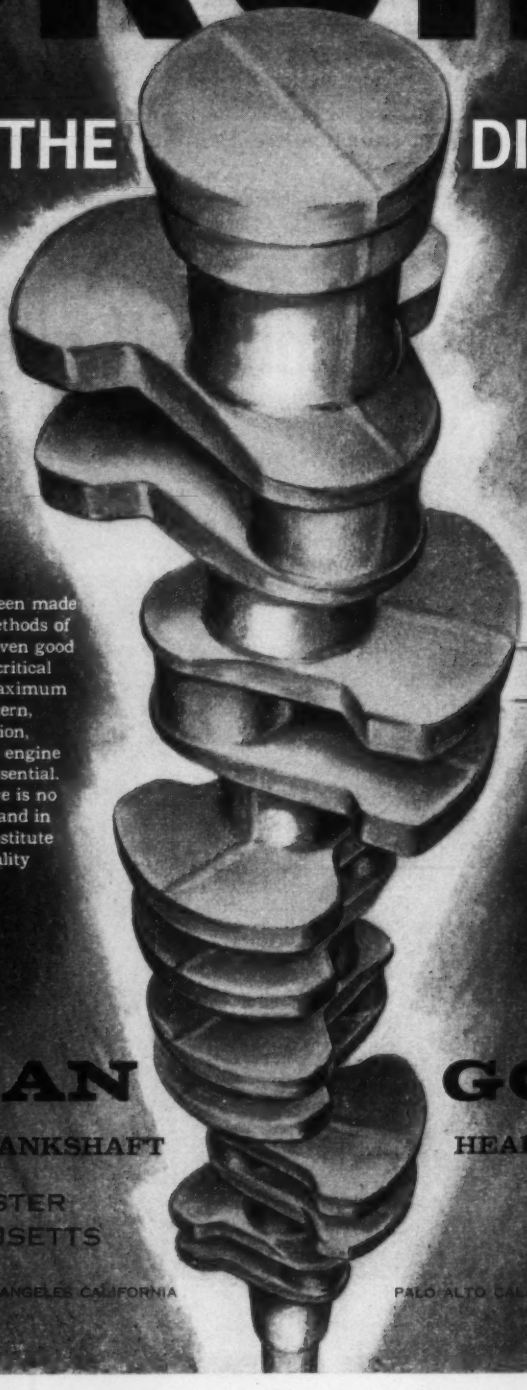

Crankshafts have been made successfully by other methods of fabrication and have proven good enough for certain non-critical applications — but for maximum dependability of the modern, compact, high-compression, high-torque, heavy-duty engine a forged crankshaft is essential.

In a crankshaft there is no substitute for a forging, and in a forging there is no substitute for Wyman-Gordon quality and experience.

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Technical Outlook

TESTING SPOTWELDS— An ultrasonic unit being tested at Chrysler Corp., Detroit, for checking the quality of spotwelds has been found to be too good: It detects weld flash and spatter which don't affect quality. Further refinement in conjunction with Sperry Products Inc., Danbury, Conn., is expected to bring the unit into practical use soon.

TEST LONG TUBES— A more sensitive version of Zyglo (Magnaflux Corp.) will be employed in a new nondestructive testing machine for stainless tubes. The automatic machine will take tubes 40 ft long. A steel company will use the equipment to inspect tubes destined for atomic reactors.

COMPOSITE MISSILE MATERIALS— High strength tubes for missile engine cases are being constructed by winding wire on a plastic core and bonding with an adhesive. The development is being carried out on a research basis.

ANTENNA BOOM— Space exploration is creating tempting markets for fabricators of steel and aluminum antennas. Nearly 1000 small dishes are already operating; one 3000 ft in diameter is planned; a 1000 ft dish will be built at Arecibo, Puerto Rico. Says Boeing Airplane Co., Seattle: In ten years, some antenna dishes will be a mile wide.

RADIOACTIVE REFINEMENT— An organic solvent is the key to a new method of extracting lanthanides and actinides (reactor products) from molten salts. Intense radioactivity decomposes water solutions, says the developer, Argonne National Laboratory, Argonne, Ill. The work reflects intense interest by research people in such isotopes.

ATOM MISERS EYE COLUMBIUM— Excellent high temperature strength and relatively low neutron absorption are the principal features which make columbium attractive as cladding for atomic reactor fuel elements, says William D. Klopp, metallurgist, Battelle Memorial Institute, Columbus, Ohio. It will work well at 1500° F whereas even the best zirconium alloys now in use lose strength above 700° F.

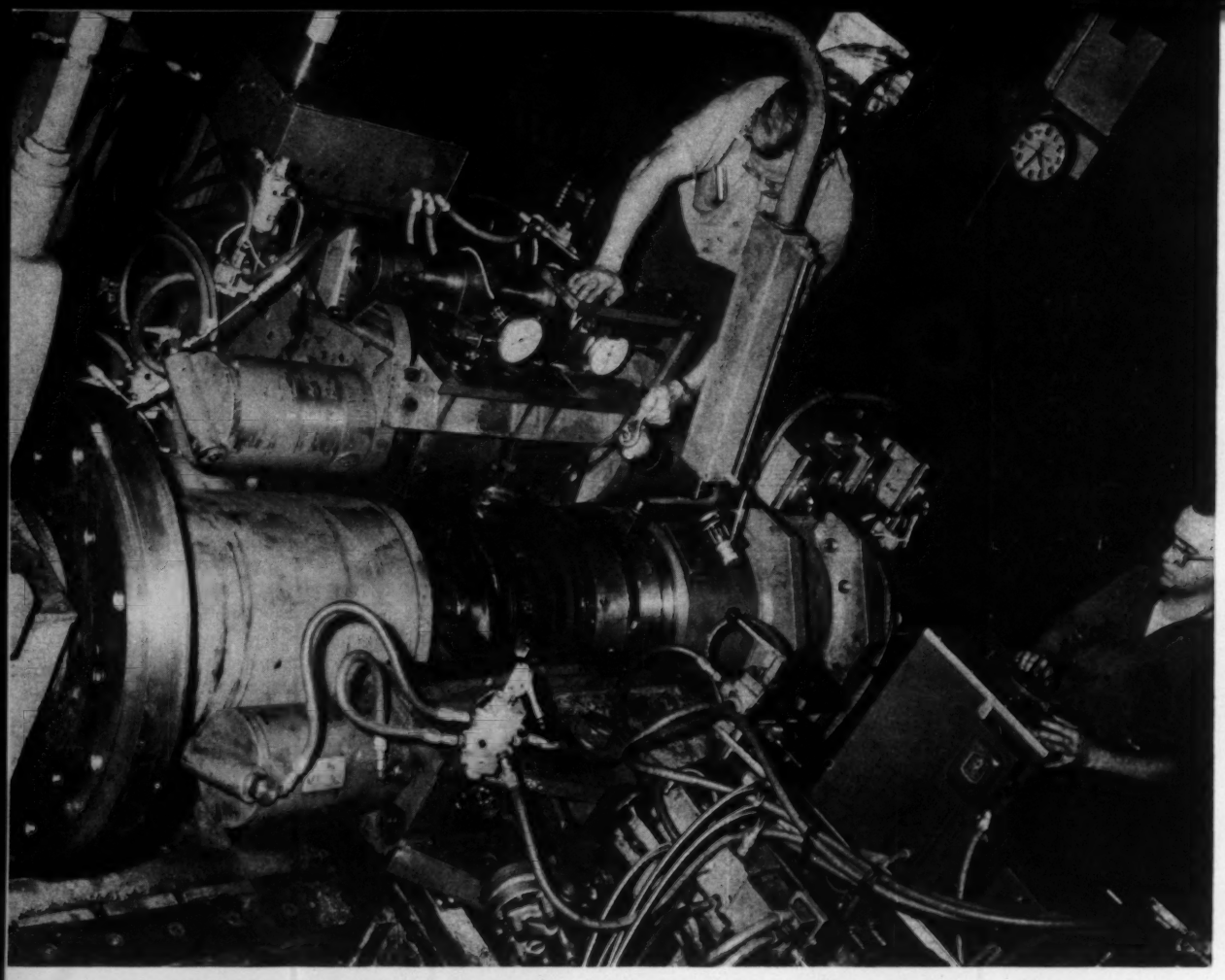
SOUND HARDENING— High speed tool steels can be hardened by ultrasonics, claims Atom Steel Inc., Cleveland. Each steel has one frequency at which it best responds to the stress relieving operation. Tools are suspended in a liquid during treatment.

COMPUTER CUTS WASTE— The British Iron & Steel Research Association claims a computer can save $140,000 a year (£50,000) when applied to a rolling mill hot saw that turns out about 5000 tons a week. Orders are fed to the computer which controls the hot saw. The computer matches orders as closely as possible to available billet sizes, so that scrap can be held to a minimum. Average savings run about 1 per cent, claims the British association.

ANTISMOG STEEL— A stainless steel with 21 per cent chromium, 6 per cent nickel, and 9 per cent manganese will be employed in antismog devices being manufactured to meet California's new air pollution legislation, says Armco Steel Corp., Middletown, Ohio.

HIGH TEMP TRANSISTOR— A new material for transistors (silicon carbide) operates satisfactorily in temperatures above 650° F, claims Westinghouse Electric Corp., Pittsburgh. The company says the material is 50 per cent better than silicon. Further work is expected to increase the top operating temperature to more than 925° F.

ADD A NEW COATING — A new family of plastic resins, called Vitel, is exceptionally resistant to abrasion, ultraviolet, chemicals, and weather, claims Goodyear Tire & Rubber Co., Akron. Important application areas: Protective and decorative coatings for metal structures.



Experimental setup on Cincinnati Hydrospin proves out reduction speeds for several sets of rolls. Completed discs are said to be uniform and have excellent quality

Cold Rolling Shapes a Better Disc

Developed for the Air Force, the method is said to improve physical properties, reduce material waste and production time on jet engine compressor discs

HIGH STRENGTH discs like those used in superjet engines can be made stronger, faster, cheaper, and more reliable by a cold rolling technique developed at General Electric Co.'s Flight Propulsion Div., Cincinnati.

Those are the conclusions of Richard Cogan and Kenneth W. Stalker who supervised that firm's manufacturing development program for the Air Force. The results, they claim, also prove that:

- Shaped blanks can be replaced with ordinary crossrolled stock.
- Machining wastes can be drastically reduced. (Material utilization is almost twice as good as that of the nearest competing process.)
- The process can be applied to practically any material that can be purchased in sheet form.
- The equipment can be numerically controlled.

• The Air Force wants today's manufacturing process upgraded to meet the heavier demands of Space Age metals.

The Air Materiel Command at Wright-Patterson Air Force Base, Ohio, puts much emphasis on cutting machining wastes. In the search for better methods, jet engine discs have been forged, cast, welded, rolled and swaged, and brazed.

The GE cold rolling method is based on the principle that metal strips, when reduced, grow longer

but not much wider. By considering a disc as a series of joined strips, you increase its diameter by decreasing web thickness.

• Blank design is an important success factor.

General Electric says that the volume of the finished piece is the same as that of the blank. You start by computing the volume of each section to be rolled. Since volume remains constant, blank diameter is established first.

Radial length of the blank web is set at one-half the web length of the finished disc. GE used two sets of rolls to form the web; if three are needed, radial length would be one-third the web length of the finished disc.

• The work on growth reveals the importance of reducing all segments of the disc accurately and simultaneously.

A growth curve is developed by computing wall thickness of web and rim for each 1 in. increase in blank diameter. Variance from that curve causes rippling of the disc or material failure. Excessive reduction of the web at any one point produces a conical shape or rippled web. Also, if the rim is reduced faster than its program, it may ripple or separate from the web under tensile failure. Some tolerance is available on either side of the growth curve, mostly due to elasticity and tensile ductility of the metal.

• The process starts with a disc of metal mounted inside three sets of opposed rolls in a Cincinnati Hydrospin. One set presses the web section near the hub; another redues the web; the third rolls down the rim.

General Electric tried six materials: SAE 1018, two types of A-286, two high strength steels, and A-110AT titanium. All worked out well.

Once the web and rim are formed, a V-shaped roller moves into the edge, spreading the material enough to permit the following roller to flatten the flange to finished dimensions. About 0.030 in. of stock is left for finish machining.

Messrs. Cogan and Stalker found that friction driving from rolls alone was insufficient to keep the disc from slipping. Instead, they adopted an arrangement which pins the blank to both headstock and tailstock.

• A finished disc was fitted with a full complement of compressor blades and tested at 8700 to 11,500 rpm. The disc worked perfectly; in the failure test, it let loose at 11,-854 rpm.

Since the disc is supposed to run at 7450 rpm (plus a 12 per cent overspeed), the cold rolling technique produces parts which stack up favorably with those produced by older methods.

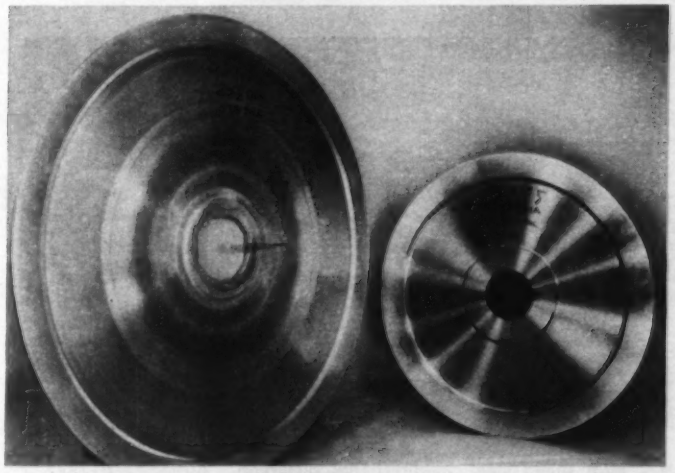
Conclusions: Cold rolled discs show less growth during service than conventionally made discs.

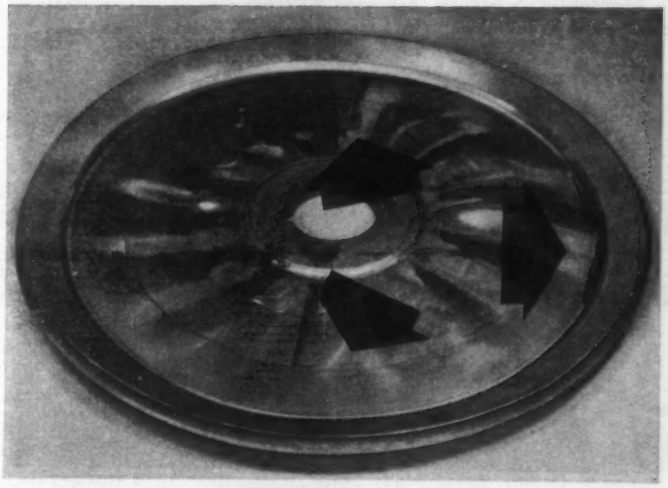
In comparisons, yield and ultimate tensile strengths exceed material specifications although elongation is lower.

Photomacrographs show desirable flow lines around the flange.

Cold rolled wheels show no surface defects, internal cracks, or voids.

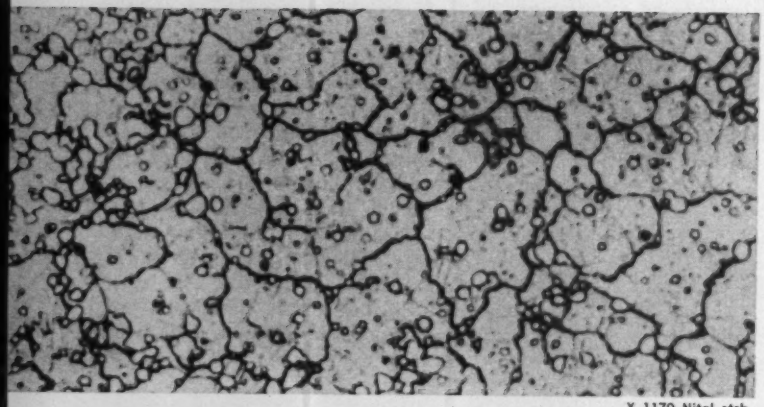
Messrs. Cogan and Stalker concluded that the mechanical properties of cold rolled and machined discs are about equal. "And cold rolling is practical. It permits greater flexibility in the selection of materials. The process itself is a test of material quality—if it withstands rolling, the material is sound. Production can also turn out finished pieces from new designs in a shorter time than was formerly possible."





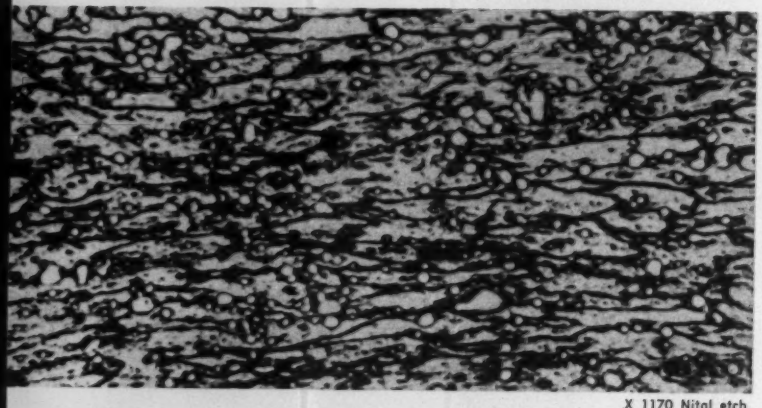
Examples of two good discs and one failure illustrate the importance of precise co-ordination during simultaneous roll reduction of web and flange areas

Treatment Ups Hardness of High Speed Steel



X 1170 Nital etch.

M-2 high speed steel, conventional heat treatment. Austenitized 2225° F in atmosphere, 5 minutes, air cooled



X 1170 Nital etch.

M-2 high speed steel, unidirectional distortion. Austenitized 2225° F in atmosphere, 5 minutes, deformed 40.2 per cent at 900 to 1000° F, air cooled

X 1170 Nital etch.

M-2 high speed steel, deformed in two dimensions. Austenitized 2225° F in atmosphere, 5 minutes, pressed in two directions 90 degrees apart at 900 to 1000° F, air cooled

How 'Hot Cold Working' Increases Rockwell Hardness of M-2 Steel

	Austenitized 2225° F Air Cooled	Austenitized 2225° F, Pressed at 900 to 1000° F, Air Cooled
As Hardened	64	66½
Tempered		
900° F	63½	66
1000° F	65	66
1025° F	65	66
1075° F	63½	66
1125° F	60½	63½

MECHANICAL working of high speed steel during heat treatment can produce higher hardness, says Richard F. Harvey of the metallurgical department of Braeburn Alloy Steel Corp., Braeburn, Pa.

The process, often called "hot cold working," involves deformation of the steel while in the austenitic condition but below the critical temperature where the austenite is stable.

Mr. Harvey thinks that the higher hardnesses which result, and persist through tempering cycles, are due to almost complete transformation of the austenite to martensite.

The increase in hardness is accompanied by a change in microstructure. Effects of the treatment on cutting characteristics remain to be evaluated; where wear is the main consideration, longer tool life would be likely, believes Mr. Harvey.

• **Tests were run on samples of M-2 high speed steel.**

Ground samples 1.025 in. square and 6 in. long were austenitized in an atmosphere furnace for 5 minutes at temperature for all tests. The resulting intercept grain size was 11.5, and the hardness on cooling to room temperature was 64 Rockwell C.

To test the results of hot cold working, another set of samples was cooled to the 900 to 1000° F range then subjected to a pressure of 1500 tons in an Erie press. The thickness was reduced to 0.612 in., for a deformation of 40.2 per cent. Hardness on cooling to room temperature was 66½ Rc, and microscopic examination showed severe deformation and flattening of the austenitic grain structure.

Another set of specimens was deformed in two directions 90 degrees apart, using a pressure of 400 tons. The microstructure also showed evidence of severe deformation.

Deformation of high speed steels in the metastable, austenitic condition results in work hardening and the transformation of a part of the austenite to martensite. But the normal conversion of austenite to martensite takes place on cooling below the Ms (martensite transformation) temperature when the steel returns to room temperature. The result is a greater over-all formation of martensite and a higher hardness than would usually be observed. Mr. Harvey reports that substantially all the austenite is eliminated; reduction of retained austenite is at least partially responsible for the higher hardness and improved mechanical properties he expects from high speed steel after hot cold working.

• **An increase of several points in hardness is obtained on M-2 high speed steels on hot cold working.**

An extension of the work done on other alloy steels to the field of high speed steels leads Mr. Harvey to feel that the treatment should improve high speed steels in cutting applications. He also proposes the use of this method to form, or partly form, some types of cutting tools to shape. A higher hardness might lower manufacturing costs.

Mr. Harvey first published a report on the working of metastable austenite in 1951.

Operator is testing extinguisher seals after they have been charged. Leak detector probe is connected to the container, and the meter registers the result

Quick, Simple Test Solves Quality Control Problem

TO MEET rigid standards in the manufacture of a new line of fire extinguishers, Ansul Chemical Co., Marinette, Wis., installed a quick, economical quality control check in its production line.

Three GE H-3 leak detectors, made by General Electric Co., Schenectady, N. Y., are used. To qualify for final Underwriters' Laboratories and U. S. Coast Guard approval, the extinguishers can't have leakage greater than 0.0125 ounces per year.

• **Nature of Test**—Each extinguisher is tested when charged and before it is shipped. The instruments, sensitive to the halogenated hydrocarbon present in the expellant gas of the dry-chemical extinguishers, determine the severity of the leak.

The first test is limited to a check for faulty seals. Its purpose is to reject extinguishers that would contaminate the atmosphere at the final check point. A probe is passed over the seal, and if a serious leak is detected, the container is discarded.

The final test in the shipping room is more elaborate. Each container is enclosed in a metal sphere. Clean, filtered air is circulated through the booth to eliminate traces of escaping gases. After 2 minutes, a cap at the top of the shell is removed, and the air inside is tested with the leak detector.

The technique permits leaking gas to accumulate to a measurable level. Extinguishers that leak at a rate greater than 0.0125 ounces a year are rejected.

• **Other Methods**—Water immersion testing is too cumbersome. Some of the disadvantages listed by Ansul engineers: It requires too much floor space; extinguishers must be cleaned and dried after each test; tanks must be maintained; tests require 6 to 9 hours vs. a few minutes via halogen leak detector method.

The mass spectrometry method requires the use of special tracer gas, and the initial investment would have been higher than that for the present method.

Four Ways Studwelding

FOUR FIRMS are collecting dividends via imaginative applications of studwelding.

1. A company producing road-making machinery now uses studs to hold cover plates. Savings: about $1 per stud.

2. A steel plant welds loose ends of hot coil strip for easy handling.

3. One equipment maker has eliminated the need to drill and tap holes in the fastening of bed plates and access covers.

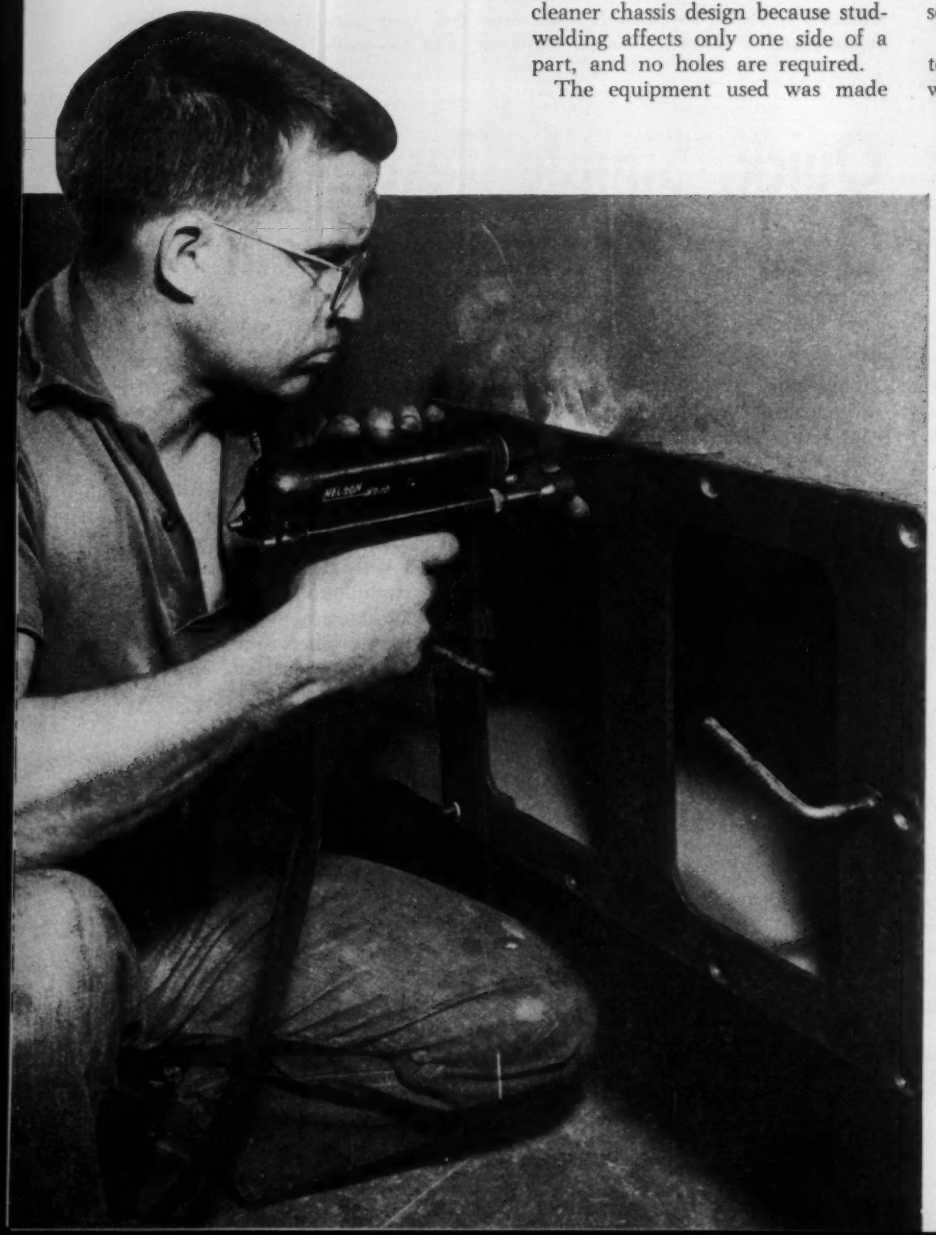
4. An electronic component company came up with a smoother, cleaner chassis design because studwelding affects only one side of a part, and no holes are required.

The equipment used was made by Nelson Stud Welding Div. (Lorain, Ohio) of Gregory Industries Inc. Here are the details.

• Small, end welded studs are knocking out a $20 saving in fastening two, gasketed cover plates on a 12 ton, pneumatic tire roller.

The studs cost Galion Iron Works & Mfg. Co. (Galion, Ohio) 6 cents each but save an estimated $1 per fastener. Added benefits: Several fabrication steps were eliminated; roller appearance is improved; and the unit can be more readily serviced.

Operators weld through a simple template at the rate of 4 per minute with the NS-10 studwelding gun.



Switch to a 6 cent end welded stud to hold a cover plate saves $1 per fastener. A template is being used

Pays Off

• Hot strip coils are studwelded to prevent uncoiling between operations.

At Armco Steel Corp.'s Middletown, Ohio, plant, the technique eliminates delays and maintenance costs due to coils opening and loosening. Safety feature: Operators have less direct exposure to coil heat.

With Armco's positioning mechanism, the loose tail end is pressed into a flush fit with the underlaps. At the touch of a button, a studwelding gun (preloaded with stud and ferrule) moves forward to fuse the tail to the inner layer of hot strip. Armco uses a knockoff type stud designed for the gage being run. One or two studs are used, depending on strip size. When coils are ready for processing, they are placed in cradle rolls and reversed a couple of times to shear the welds.

• The process eliminates drilled and tapped holes, reduces material handling, and saves up to 14 man-hours for a manufacturer of drum filler machines.

Rucker Co. (Oakland, Calif.) uses threaded granular-flux-filled studs end welded directly to the top flanges and tank ends. Bed plates and access covers are secured with regular nuts.

Rucker says additional savings are made by attaching small parts such as pipe clamps and gages to bed plates with end welded studs.

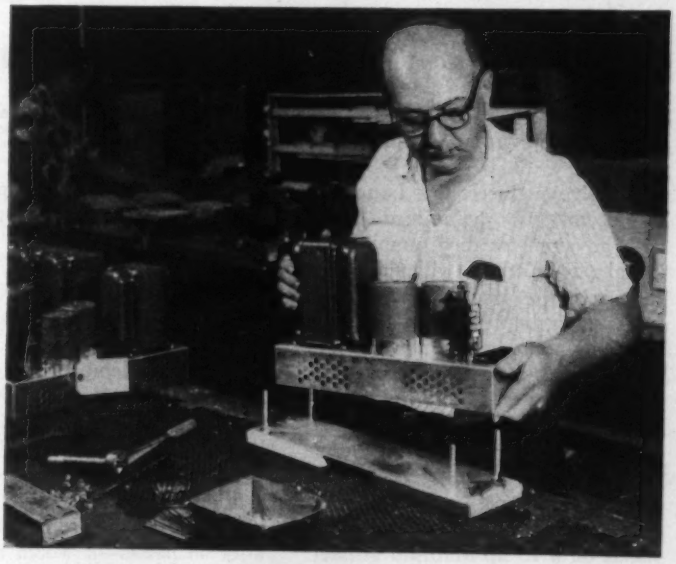
• End welded studs are being used as one side fasteners to preserve the unmarred appearance of panels for constant voltage, direct current power supplies.

Assembly time was cut at Sola Electric Co. (Chicago) because drilling and countersinking of $\frac{1}{8}$ in. thick panels were eliminated.

Two stud sizes are used. On most panels, a stud is welded at each corner; the chassis is put in place; and the nuts are run down on the threaded ends.

Studs are welded at an average rate of 3 per minute with a production welding unit mounted on an air cylinder.

At Armco Steel, a material handling problem is eased by studwelding coil ends to prevent uncoiling between processing steps. Rollers on Armco's automatic positioner hold the outer lap while the weld is being made. On wide strips, a manually operated gun augments the unit between the rollers



Appearance is improved and assembly is speeded up by using end welded studs to secure the Sola power supply chassis to the panels. No drilling or countersinking is necessary

New Technique Aids Belt Grinding

A NEW trick in the machine cycle may cut abrasive belt costs as much as 32 per cent, reports Minnesota Mining & Mfg. Co., St. Paul.

A schedule called "power programing" is the key to the economy. Its purpose is to maintain a constant rate of cut by increasing the pressure between the belt and the metal as the belt dulls or becomes worn.

• Power programing is credited with four advantages.

1. It can provide a more uniform stock removal from one end of the coil to the other, or from sheet to sheet, thus insuring against recycling of a coil or a stack of sheets.

2. Adjusting power to belt sharpness helps to eliminate the wastefulness of overcutting and undercutting.

3. By making more efficient use of available horsepower of the machine (jobs frequently use only 50 per cent or less), power programing can do more work per hour, with lower coated abrasive cost and a better finish on the work.

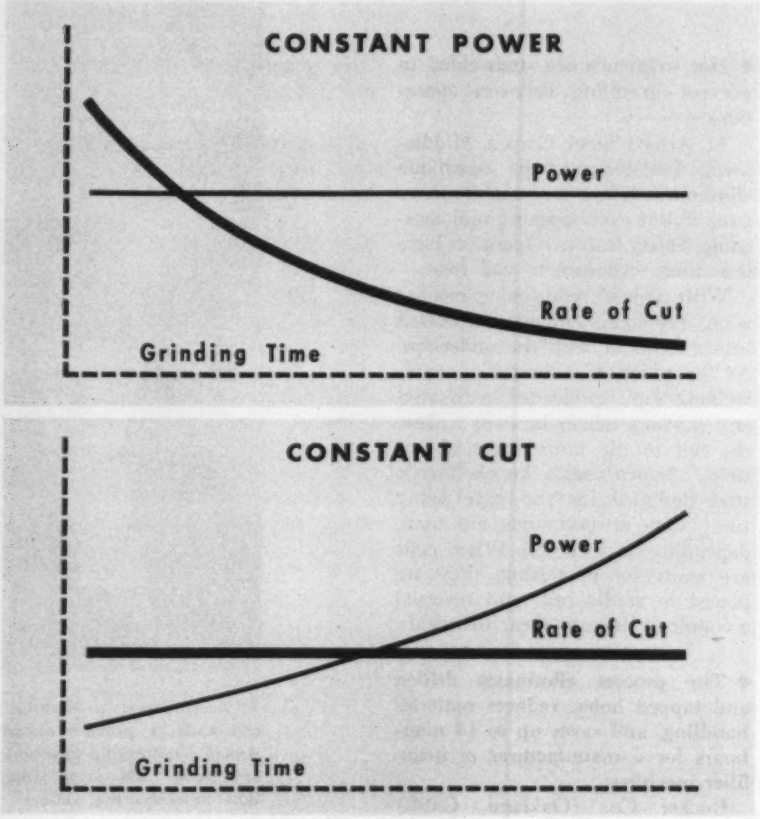
4. Throughout its life, the belt provides a more uniform surface finish since it is made to cut more evenly by increasing pressure as it dulls.

• A power program is tailored to the job.

Abrasive engineers first figure the rate of cut to be maintained. Next, with an ammeter they establish an initial power which will yield that rate and the rate of increase of load required to maintain the rate. The end point in the power curve will often be the maximum available horsepower.

The final program is presented to the machine operator in terms of the ammeter reading needed for each series of passes. Here's part of a program for grinding C110M sheets on a 75 hp Mattison grinder:

Passes 1-10	100 amp
Passes 11-25	125 amp
Passes 26-40	150 amp



These curves show how conventional belt grinding (at top) maintains constant power and power programing (bottom), provides for a more constant resultant cut

• The technique has proved itself in tests.

In one test, grinding titanium sheets, the standard procedure (grinding at a constant power of 2 hp per inch of width) a Grade 80 belt showed a variation in depth of cut of 0.00065 to 0.0001 in. in 30 passes. By programing the power consumption from 1.1 to 5.4 hp per inch, a fixed depth of cut of 0.0005 in. was maintained for 30 passes, increasing the total stock removal by 49 per cent.

In a test on titanium sheets, conventional techniques would have necessitated discarding the belt after 44 passes—it would no longer be producing a satisfactory cut. Power programing extended the belt's useful life to 93 passes.

Another set of tests on titanium showed that with standard practice (initial pass at 100 amp—adjustments at operator's discretion) a Grade 80 belt produced an average cut per pass of 0.000191 in., a total of 18.8 cu in. of metal removed. With power programing, the same belt and a scheduled increase of 25 amp loading every sixth pass removed an average of 0.000271 in. per pass and took off a total of 27.8 cu in. of metal.

Says Dr. H. L. Weisbecker, supervisor of 3M's Physical Studies Section, Coated Abrasive Laboratory: "The efficiency of the power programing technique has been demonstrated in several plants. In one instance, the passes taken per sheet were reduced by a factor of eight."

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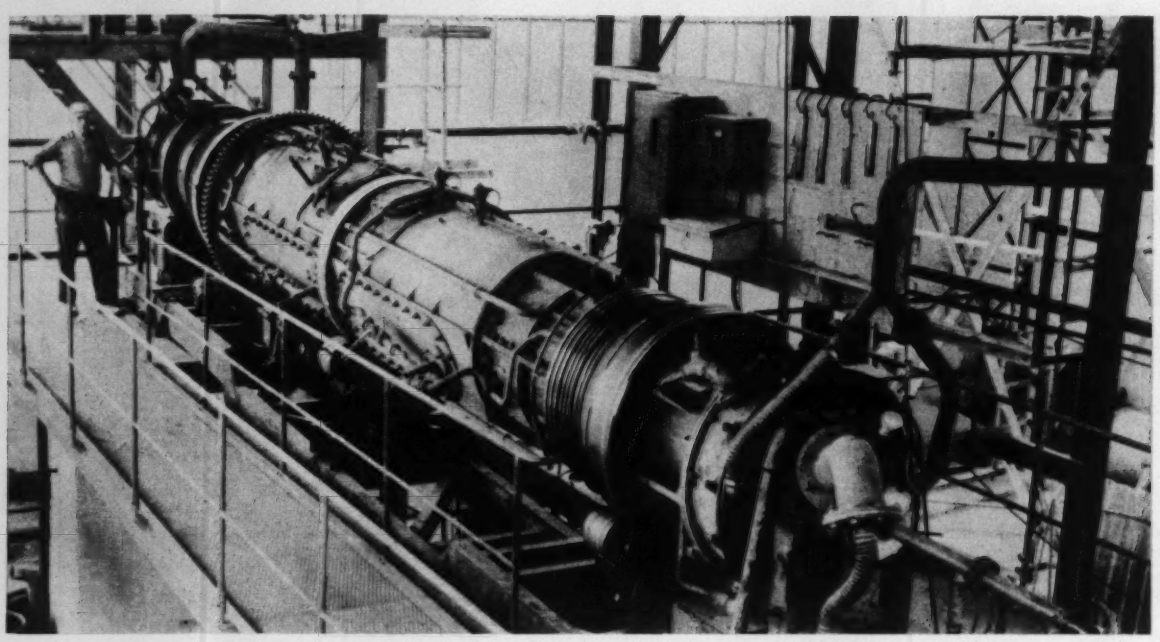

This test model kiln, which can process a half ton of ore per hour, is similar to units that will be used to roast low grade, nonmagnetic iron ores from the Mesabi range

Marginal Ores Upgraded By Magnetizing Roasting

Kilns, traveling grate machines, shaft furnaces, and fixed bed processes figure in the plans of mining men who hope to recover low grade ores profitably

BENEFICIATION processes that make marginal iron ores marketable at reasonable cost are expected to become a more important factor in deciding the source of blast furnace raw materials.

Magnetizing roasting, which transforms low grade, nonmagnetic ores into magnetically separable material, may help keep Minnesota ore fields in the volume steelmaking picture. And variations of the basic beneficiation method may permit each ore processor to select capital equipment that is economically right for his operation.

• Reduction of the ore must be carefully controlled to make the largest possible percentage of synthetic magnetite.

"Some ores can be upgraded easily by dry, low intensity, or high intensity methods; spirals; wet magnetic separation; or flotation," says D. J. Hains, of Hains Engineering Co. Ltd., Toronto, Ont. "But others require heat and chemical reaction. That's the principle of magnetizing roasting." Mr. Hains described magnetizing roasting in a rotary kiln (as practiced at a Canadian ore mine) at a symposium of the Electrothermics & Metallurgy Div., Electrochemical Society, in Chicago.

The process features conversion of crushed, nonmagnetic material to synthetic magnetite; that permits separation of magnetic particles from the waste rock with conventional magnetic equipment. When the low grade ore is heated in a reducing atmosphere, its oxygen content is slightly diminished.

The Canadian kiln was originally fired with bunker "C" oil; natural gas can also be used. Reduction is carefully controlled to prevent formation of nonmagnetic iron oxide or an unsatisfactory yield.

• Rotary kiln pilot plants are being built to process ore on the western Mesabi range.

A 10-ton-an-hour plant will be operated at Cooley, Minn., by M. A. Hanna Co. The kiln will be 88 ft long and about 9 ft in diameter. Using fuel from a gas producer unit, it will be part of a continuous concentration process. After cooling and intermediate grinding, the synthetic magnetite will pass directly into magnetic separators. Iron particles will adhere to the magnets, but quartz and other nonmagnetic materials will not be attracted.

Another pilot plant, rated at 2 tons an hour, will be put into op-

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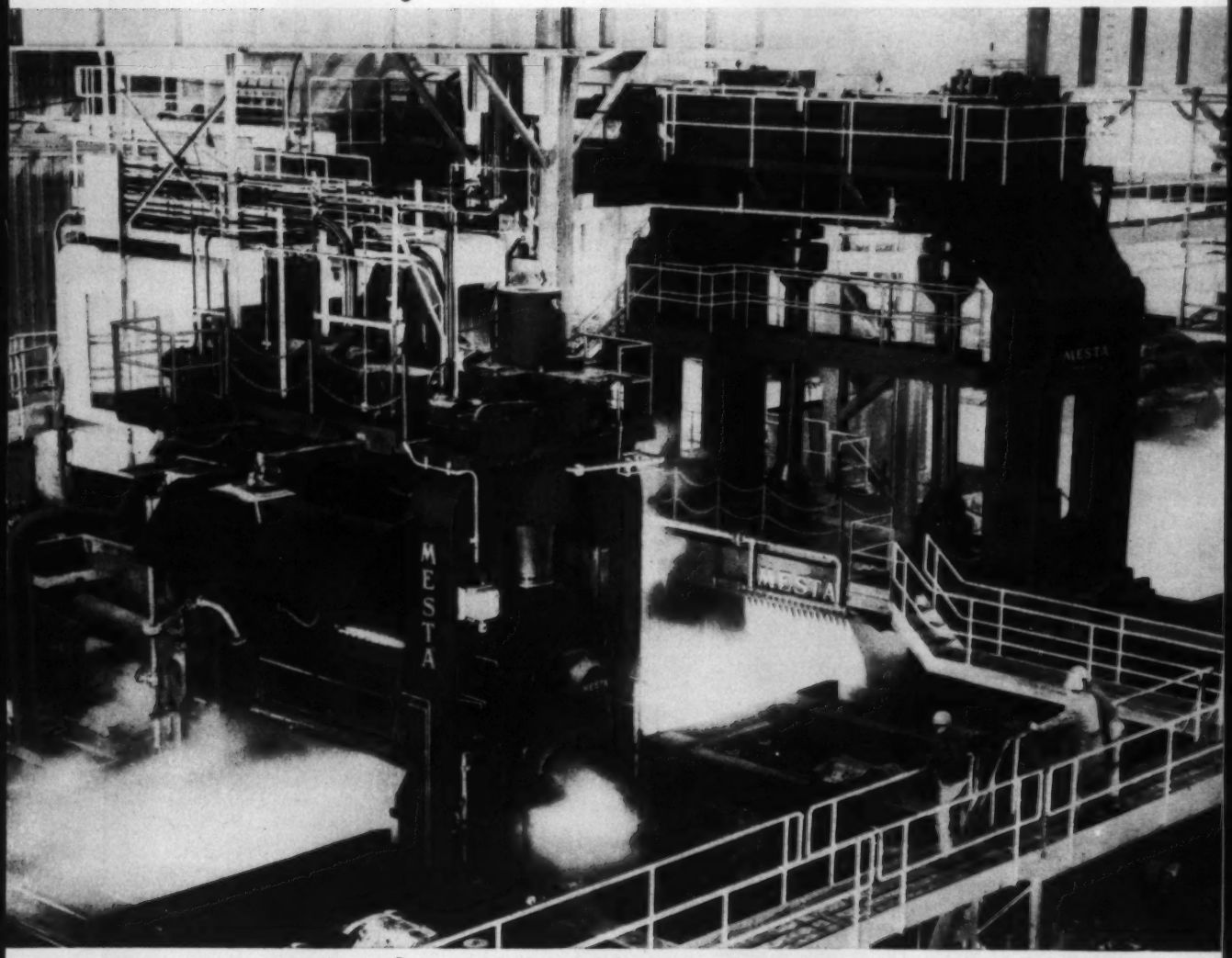
FOUR-HIGH REVERSING MILL and VERTICAL EDGING MILL for SLABS and PLATES

At Lukens Steel Company, the 140" Four-High Reversing Plate Mill and Vertical Edging Mill is an unusual installation. Although this mill is operating primarily as a slabbing mill to reduce ingots into slabs for rolling plates on other mills, it can complete the rolling of plates to finished sizes directly. The Vertical Edging Mill, largest ever used in tandem with a Plate Mill in this country, provides edge rolling of the ingot which remains in the horizontal position during the complete operation. This installation is the major unit which will increase the plate rolling capacity at Lukens by 40 per cent.



Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

eration at Coleraine, Minn., by Oliver Iron Mining Div., United States Steel Corp. The kiln, 50 ft long and 6 ft in diameter, will be fired initially with reformed propane. But natural gas or producer gas made from lignite or coal is said to be usable. The roasted product will be taken to Oliver's facility at Duluth for magnetic separation.

Kilns for both plants are to be supplied by Dravo Corp., Pittsburgh, under a licensing agreement with Lurgi Gesellschaft fur Chemie und Huttenwessen M.b.h., Frankfort, Germany.

Dravo engineers estimate that a kiln about 164 ft long and 12 ft in diameter would be required in the smallest practical production plant. Such a kiln would turn out 60 to 80 tons of roasted ore per hour. Larger kilns or multiple units could be employed for greater capacity.

• Traveling grate machines are being considered as vehicles for the roasting process.

An extensive research program on magnetic roasting is underway at the Mines Experiment Station of the University of Minnesota. The program was described by G. Bitsianes, associate professor, metallurgical engineering, School of Mines & Metallurgy, at a meeting of the Minerals Beneficiation Division, Society of Mining Engineers, American Institute of Mining, Metallurgical & Petroleum Engineers, in New York.

Preliminary studies indicate that traveling grate machines are well suited for the roasting process. A bed of crushed ore is subjected to the action of a preheated, reducing gas stream. The gas is formed by controlled combustion of natural gas.

An experimental roaster at the station has processed 1000 lb of dry ore per hour regularly. It is said to have a capacity of 4000 lb per hour under special conditions.

Elsewhere, a tandem shaft furnace has been used for magnetic reduction of jaspilite, a dense, low grade hematite ore. In pilot operation, the method processes about 1.5 tons of ore an hour. The product is ground and separated magnetically. Fixed bed reduction of low grade rock samples and balled crushed or ground ores is being investigated at the laboratory level.

Hot Gases from Electrics Cleaned with Glass Bags

THE TREND toward complete control of steel plant dust and fumes continues. And steelmakers aren't overlooking the need for effective antipollution equipment for the electric melt shop.

Example: A West Coast mill is said to have eliminated objectionable emissions from its electrics with a system of collector hoods and high temperature filter bags made of silicone treated Fibreglas. The filter setup, or baghouse, was supplied by Western Precipitation Div. (Los Angeles) of Joy Mfg. Co.

• The baghouse is said to operate like an oversize household vacuum cleaner.

The equipment handles fumes from the plant's 100 ton electrics, which turn out over 270,000 ingot tons of steel annually. On the basis of prototype performance, plant officials predicted that the system would remove virtually 100 per cent of the dust given off by the furnaces.

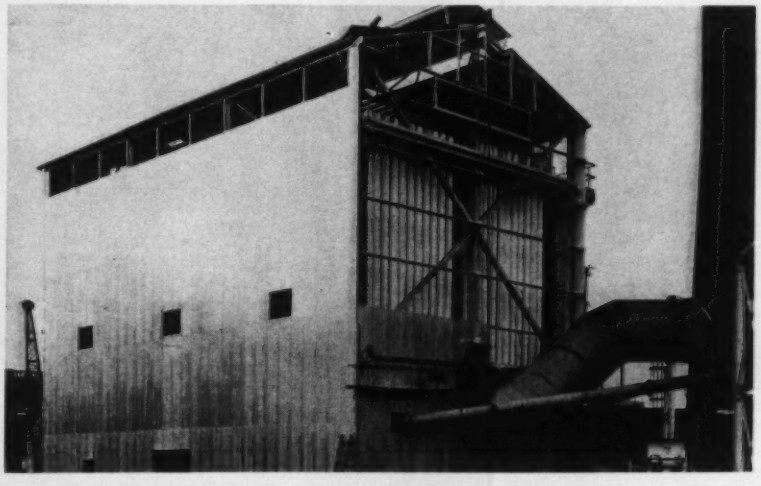
The filter bag installation consists of 792 bags, in groups of 66 each. Made of silicone treated, woven glass fabric, the bags are 25 ft long and 12 in. in diameter. Each bag is collapsed every half hour; loosened dust drops into hoppers. It is then taken by conveyors to a railroad car.

• High temperature dust collectors make large volumes of cooling air unnecessary.

The filter bags can handle gases at temperatures up to 600° F. That reduces plant operating costs and capital investment.

The filters are cleaned by a gentle collapsing action instead of severe shaking. Dust particles aren't allowed to build up on the inner surface of the bag, clogging the filter fabric. And the glass fiber filters are said to resist attack by corrosive impurities in the gas stream.

Ordinarily, gas cleaning systems use filter bags made of synthetic materials, which are said to have a temperature resistance limit of 270° F. More than 1½ volumes of air at 100° F must be introduced for every volume of hot plant gases, to reduce the temperature from 600° to 270° F. The dust collector, dust system, fans, and other equipment would have to be designed to handle 2½ times the volume of the hot gases coming from the furnaces.



Fibreglas filters in the metal baghouse collect smoke and dust from electric arc furnaces. The bags can stand temperatures up to 600° F

Sundstrand **RELY-ABILITY**
is being applied in all environments

Total capability in power systems for land, air, space, and underwater vehicles

When an F-101 jet fighter challenges the skies, Sundstrand constant speed drives power its electrical system . . . a Sundstrand hydraulic motor turns the electrical generator on the Hound Dog missile . . . Boeing 707-120B jetliners take off with added thrust from water injection supplied by Sundstrand Sundyne pumps. These are products of Sundstrand Aviation and Sundstrand-Denver.

In many an air-conditioned bus a Sundstrand constant speed drive is part of the refrigeration system . . . frozen foods are delivered in trucks equipped with Sundstrand refrigeration drive systems . . . and now farm and industrial mobile equipment is being propelled by Sundstrand hydrostatic transmissions. These are products of Sundstrand Hydraulics.

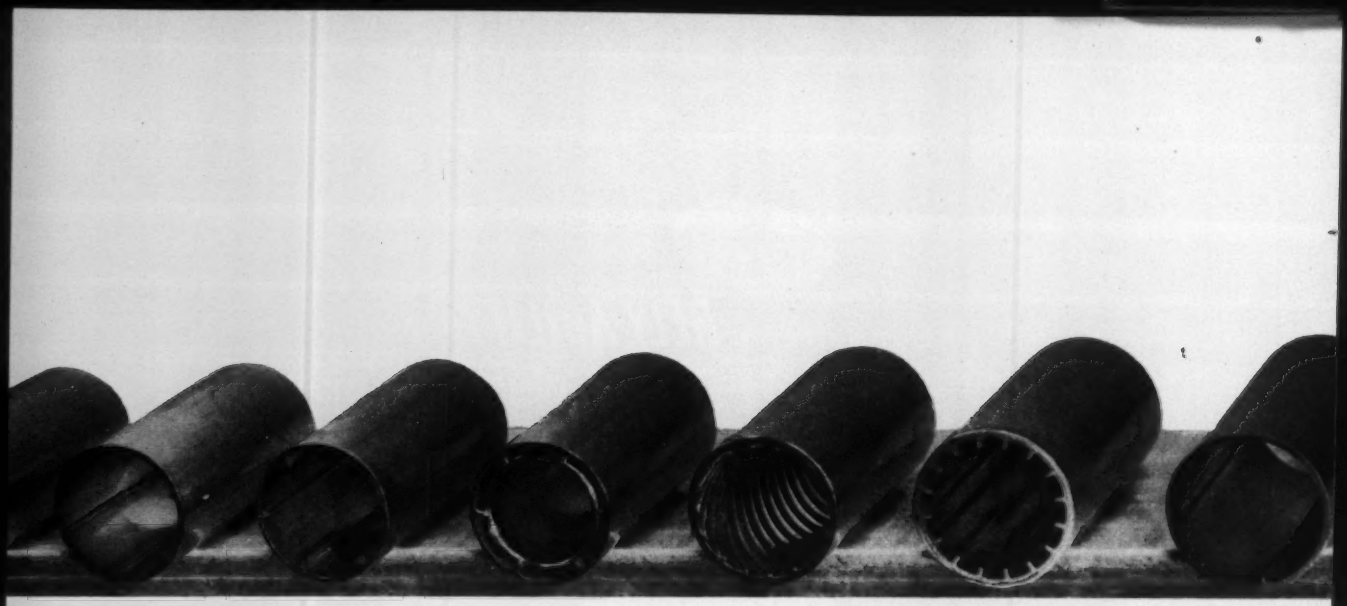
Torpedo-propulsion systems for submarines . . . solar regenerated fuel cells, flight attitude control systems, and chemically powered fuel cells for space vehicles—these are among the development programs of Sundstrand Turbo.

Other products of Sundstrand Rely-Ability include: pushbutton and numerically controlled machine tools, transfer machines, air and electric sanders, and specialties for metalworking and general industry.

SUNDSTRAND CORPORATION

SUNDSTRAND

ROCKFORD, ILLINOIS



Tubemaker Markets Precisely

Cold finishing method produces accurate, concentric tubing and special inside diameter shapes in stainless and other hard to work materials. One advantage: Lower cost

FORMED TUBING offers a number of advantages when parts require complex inside diameter designs.

The producer (Damascus Tube Co., Greenville, Pa.) says its cold rolled product (called Flo-Rol) opens up a range of design possibilities because:

- It can be obtained in dimensions not otherwise available.
- It can be obtained as precision, thin walled tubing.
- It can be made of hard to extrude materials.
- It can be obtained as bimetal tubing.
- It can be obtained as hollow wall or chamber wall tubing.
- It can be obtained in lengths of more than 50 ft.

• Tubes can be held to ±0.0005 in. on wall thickness and ±0.002 in on diameter.

The process has a forgelike effect on the tubing. Minor surface irregularities on the outside diameter and inside diameter are removed, and the grain structure is denser than normal. The surface has a 6 to 8 microinch finish; corrosion resistance and tensile strength are increased. Many internal contours can be produced.

Initially, the emphasis will be on stainless steel and other special corrosion resistant alloys. Other materials have been Flo-Roled—titanium, tantalum, zirconium, and special high strength, high temperature, or special alloys, such as Hastelloy and precipitation hardening alloys. Carbon steel and lower cost alloys can also be used, but the biggest advantage will be with the more expensive materials.

Damascus believes that nuclear applications have a lot of potential. Tolerances of zirconium and stainless steel tubes are expected to be easier to meet. Laminated tubing (two or more metals) is also possible.

• The setup produces extra long tubes.

Damascus is able to produce 75 ft lengths at no extra cost. All lengths can be made in ½ to 2¾ in. diameters. Standard wall thicknesses go up to 0.148 in.

• The company uses a machine made by Meta-Dynamics Div., Cincinnati Milling Machine Co., Cincinnati (see STEEL, Feb. 16, 1959).

The tube is placed on a mandrel and passes through a set of pulsating dies.

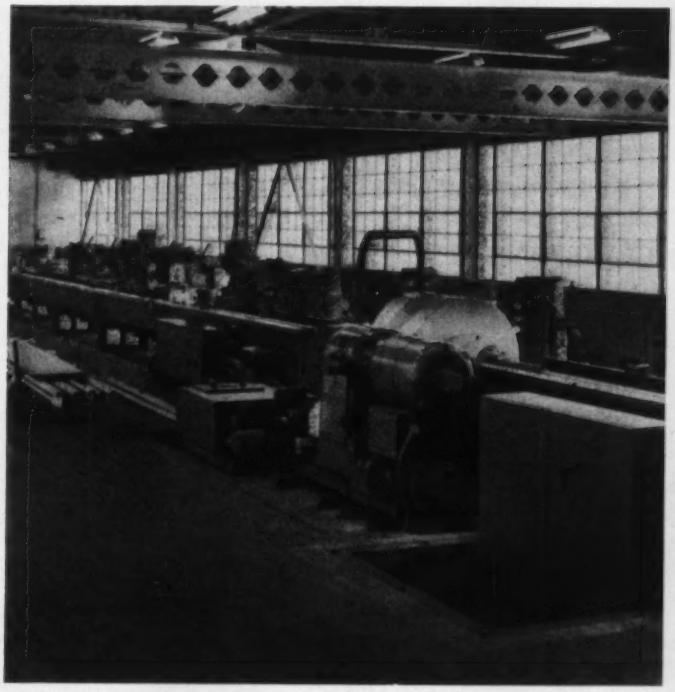
The dies squeeze the tube to conform with the mandrel's shape. The tubes (in 75 ft lengths or shorter) require no further finishing after coming off the line.

Where internal configurations have been impressed on the inside diameter, they have the same accuracy as the wall. Internal shapes such as fins or grooves are made in one operation. Tool changes take only minutes.

These cutoff samples show several internal shapes and materials. Left to right: Zirconium, stainless steel, Hastelloy, hollow wall stainless, stainless with threaded copper insert, stainless finned tube with thin tantalum shroud, and titanium tube with straight fins

Contoured IDs

The tube forming equipment uses a set of four dies (cam actuated) to produce a rapid pulsating action around the workpiece. The pieces (welded tubes, 75 ft long) are pushed through and emerge as precision tubes at the right



Billet Centering Machine Speeds Piercing Operation

A hydraulic billet centering machine has been installed at Ohio Seamless Tube Div., Copperweld Steel Co., Shelby, Ohio. The unit was supplied by Lombard Corp., Youngstown.

The machine is said to improve rotary piercing and subsequent mill operations by locating the center hole more accurately. Shell crop loss has decreased because of the excellent concentricity of the starting end. Increased center hole depth also makes for easier billet entry into the piercing rolls.

Only the work end of the billet is gripped while the hole is being formed, regardless of length or cross section. A dual purpose, hydraulic cylinder automatically closes the gripping jaws and moves the centering tool into the billet, which is ejected when the tool and gripping jaws are retracted.

The machine can center alloy billets up to 7 in. in diameter at a rate of 5 per minute. Mechanical and hydraulic components of the unit can be adapted for use on existing tables, without major modification.

Offers Two Mold Washes

Two silicone materials for use as ingot mold washes have been developed for the steel industry by the Silicone Products Dept. (Waterford, N. Y.), General Electric Co.

One of the washes, called XM-2020, is an emulsion for hot molds. The other, called XS-4017, is a solution of silicone in a fire resistant, volatile carrier. It can be used on hot or cold molds.

The coatings are said to prevent splashes of molten metal from sticking to the molds. Purpose: To reduce inclusions, pits, folds, scale, and other surface defects. In some cases, clear, silvery bright ingot surfaces have been reported. The small amount of scale that forms is easily removed.

Improvement of surface quality is said to reduce metal loss, shorten ingot preparation time, and speed up rolling mill operations—ingots can be reduced to size from the initial soaking heat, without interruptions for cooling, scarfing, grinding, and reheating.

For Quality and Economy Use

MALLEABLE

For Service Contact...

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company,
Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

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Belcher Malleable Iron Co., Easton

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Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
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MINNESOTA
Northern Malleable Iron Co., St. Paul 6

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Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

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Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division
Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

More than 1.4 million welds are used to fasten the stainless liners to steel base metal. Devices employ consumable electrode plus inert gas shielding

Manual Spotwelders Fasten Wind Tunnel Lining

SOME OF the high cost of building supersonic wind tunnels has been solved by employing a combination of high strength steel covered with a thin stainless liner.

American Bridge Div., U. S. Steel Corp., used the method on four, air receiver sections. The firm employed submerged arcwelds to join the steel and Sigma spotwelders to fasten the stainless liners to the base metal.

• Chief fabricating problem was smoothness of liners to maintain low resistance to supersonic air flow.

Only one side of the liner was available for welding. That eliminated the possibility of employing resistance spotwelds. Sigma methods enable operators to fasten from one side and leave the metal surface fairly smooth. Here's how it was done:

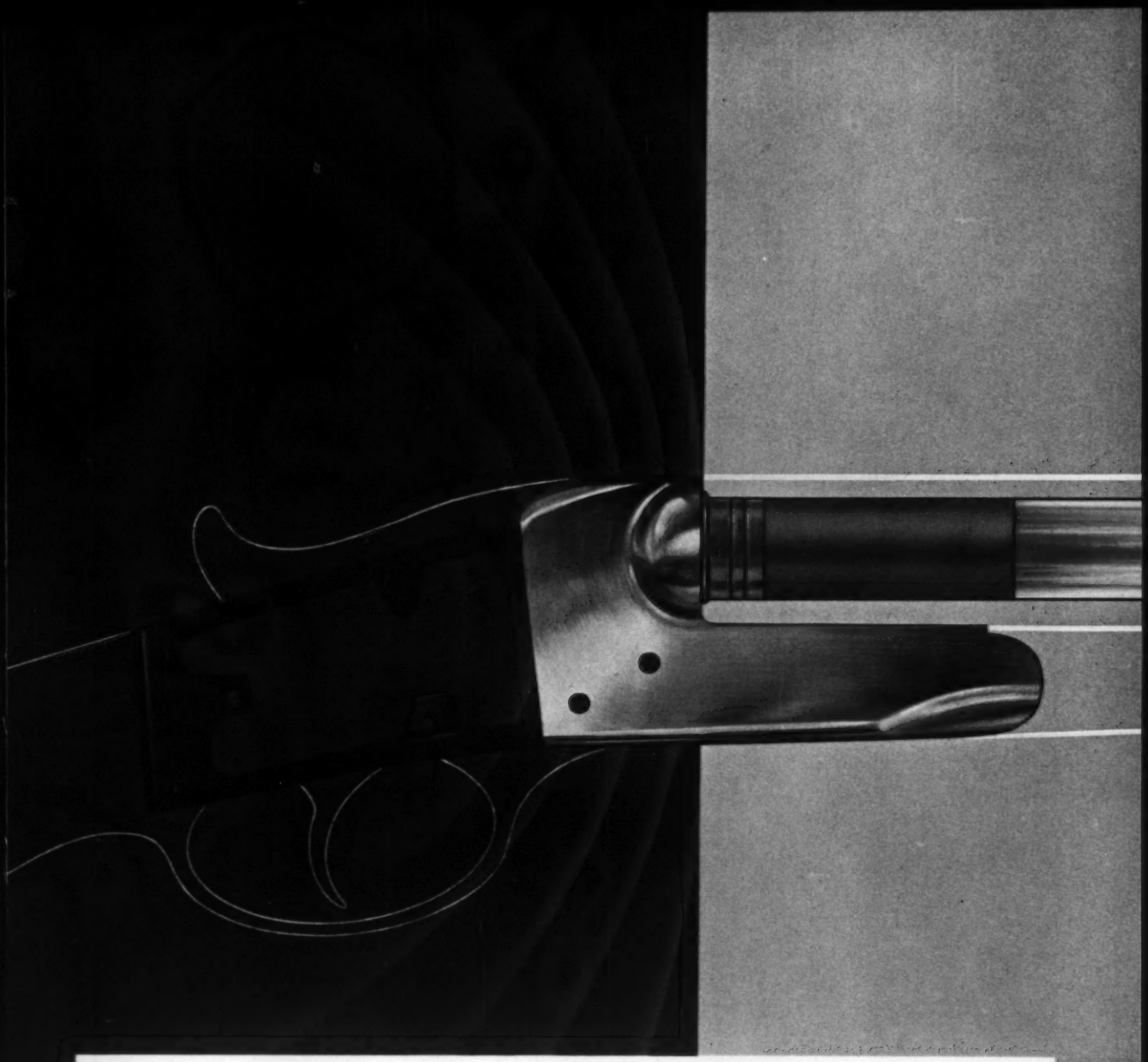
Each vessel is 100 ft long and 11½ ft in diameter. Two submerged arcwelding heads mounted on a positioner buttwelded 1⅞ in. thick A-212B steel plates in the shell. Four root passes and seven cover passes were required.

Completed vessel shells were sand blasted to remove all scale and rust. They were lined with Type 308 stainless sheets (9 ft by 4 ft by 7/64 in.) lightly spotwelded until the fitting was complete. Heating eliminated moisture. Tape over the seams kept out dirt.

Final operation: Placing spotwelds on 1 by 1½ in. centers. It took almost 1.5 million welds and 12,000 lb of stainless steel wire, say engineers at Linde Co., a division of Union Carbide Corp., New York.

The completed vessel withstood a 500 psi test. The spotweld acceptance rate exceeded 99 per cent. A pull test of the spots showed that 2275 to 2400 psi was necessary to rupture the joint—four times better than expected.

The finished liner is smooth enough for low resistance to supersonic air flow and strong enough to stand up to the high temperatures generated.



Pressure on the face of this Malleable iron receiver approaches 5 tons per square inch each time this 12 gauge shotgun is fired.

For Really Tough Parts...Use Malleable

With high powered charges being fired just inches from your face, you don't want parts that can't take it. That's why so many weapon parts are made of tough Malleable iron castings.

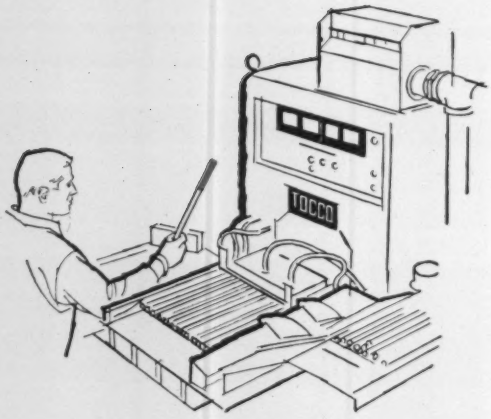
Tremendous resistance to impact, fatigue, deflection, and wear also makes Malleable castings favorites among manufacturers of mining and construction equipment, heavy-duty tools, and other products that require extra tough components.

Have you investigated how Malleable castings will improve your product's performance and cut costs at the same time? If not, send drawings or outline of your requirements to a nearby Malleable castings producer who displays this symbol —

MEMBER

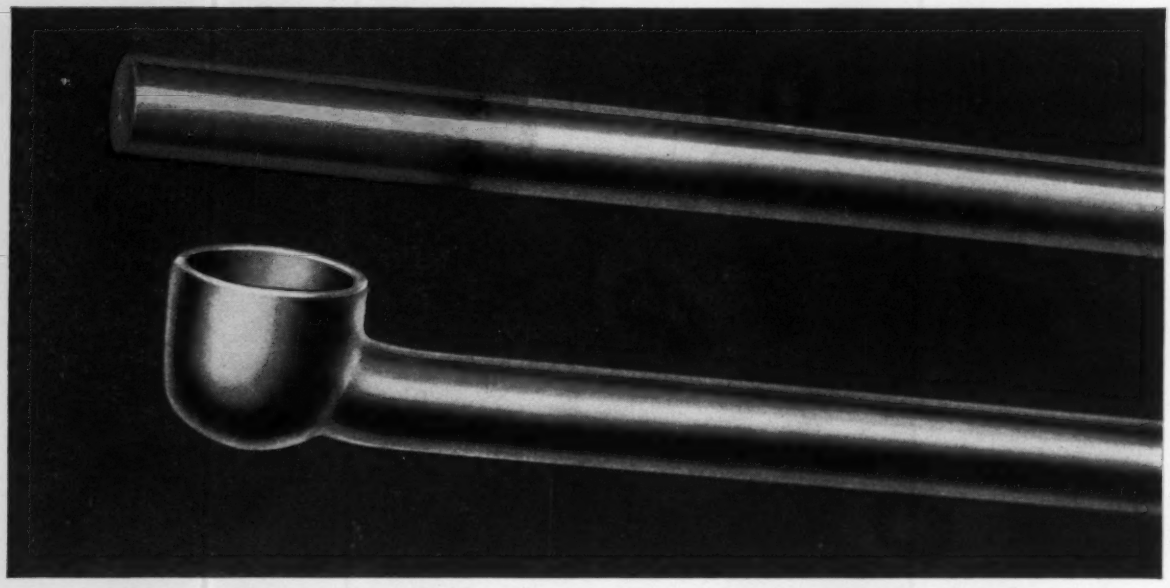
MALLEABLE CASTINGS COUNCIL

For detailed information on "Toughness", contact any of the progressive companies listed on the opposite page, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.



Heating Costs *Cut In Half*

with TOCCO* *Induction Heating*



Engineers at Thompson Products Michigan Division of Thompson RamoWooldridge, Inc. recently changed from gas-fired furnaces to fully automatic TOCCO. Application: heating for forging of automotive tie rods. Result: a substantial reduction in direct labor costs, saving thousands of dollars a year on this heating for forging operation. *Annual savings actually amortize the cost of the TOCCO installation in about one year.*

The automotive tie rod shown here is only one of over 500 parts heated for forging in Thompson's new, modern forge plant. *Every one of these parts is heated with TOCCO equipment.*

If *your* manufacturing operations require heating for forging, heat treating, brazing, soldering or melting, it will pay you to investigate TOCCO as a sound method of increasing production and lowering costs.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— **NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. S-10, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forging and Forming".

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

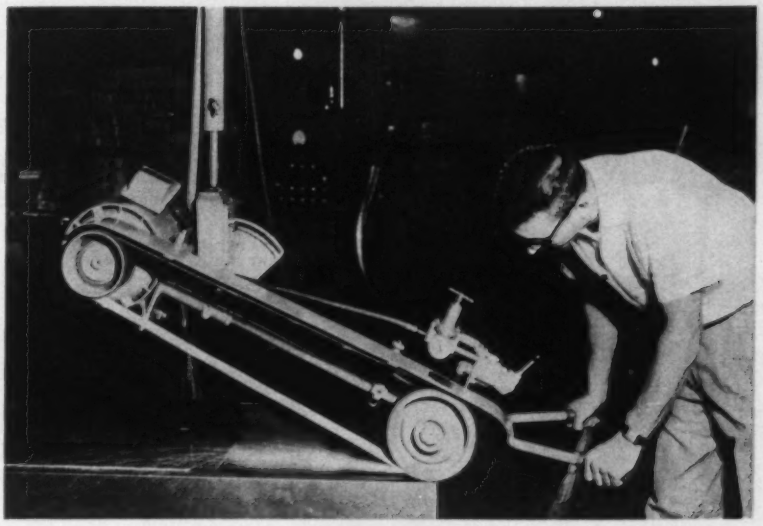
This Belt Grinder Doesn't Need Much Space

A COMPACT, medium duty belt grinder developed for use where space is a problem is slightly larger than the company's 6-72 models, but considerably smaller than its heavy duty, abrasive belt units.

The new unit is powered by a 3 or 5 hp motor, uses a 90 in. abrasive belt with an 8 in. contact wheel. The belt has positive air tensioning control.

Standard accessories adapt the grinder for use as a floor stand unit, swing frame grinder, or lathe mounted cylinder grinder or polisher.

For further information, *write* Grinding & Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis 5, Ind.



Fork Truck Lifts at 74 fpm Loaded, 91 fpm Empty

A GAS powered, fork truck (CY 20) made by Clark can lift up to 2000 lb. It's equipped with pneumatic 6.50 x 10 tires (drive and steering) on a 54 in. wheelbase.

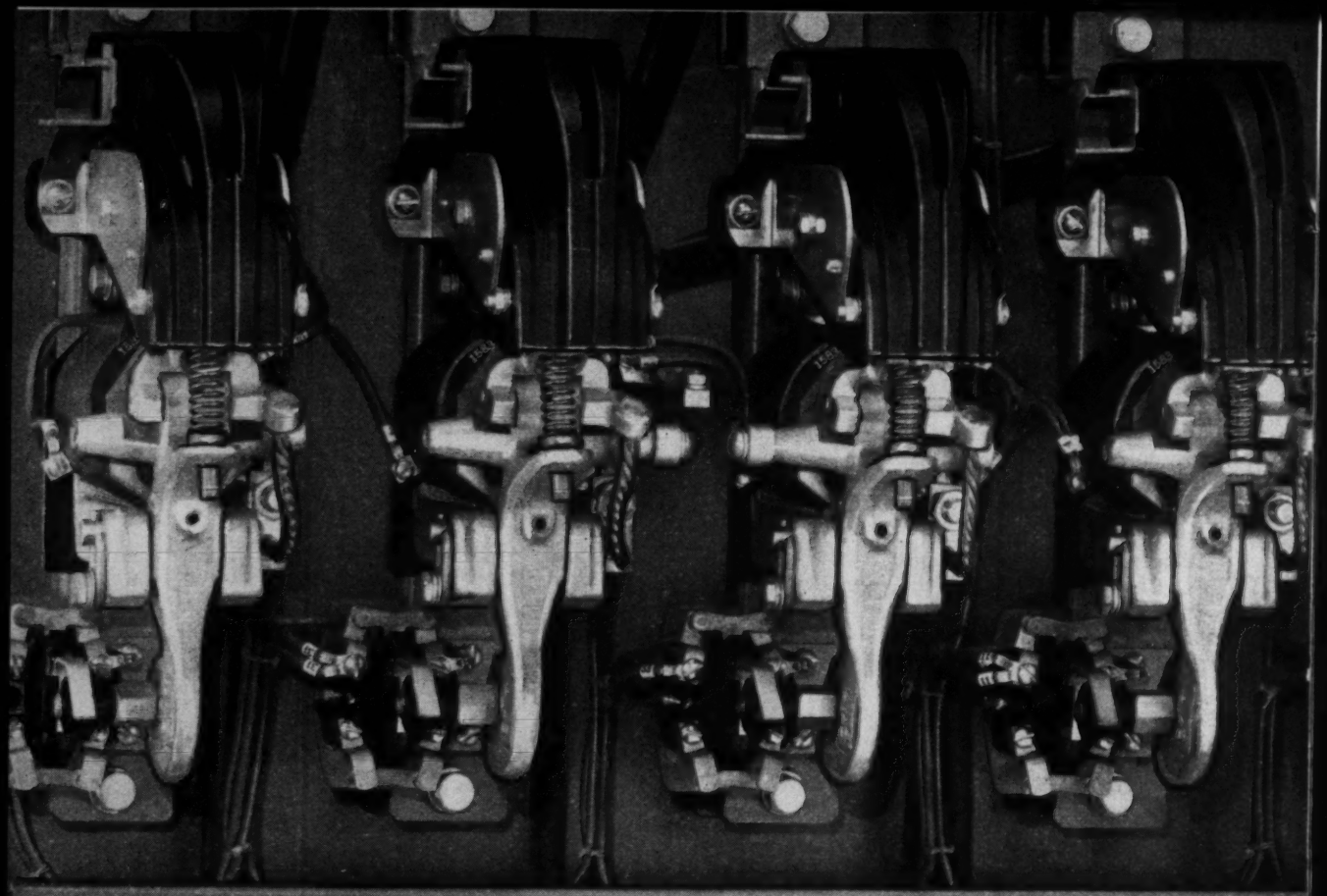
The unit is powered by a 49 hp engine (162 cu in. displacement) that develops 123 lb-ft of torque. It can start and stop on a 37.5 per cent grade with a 2000 lb load.

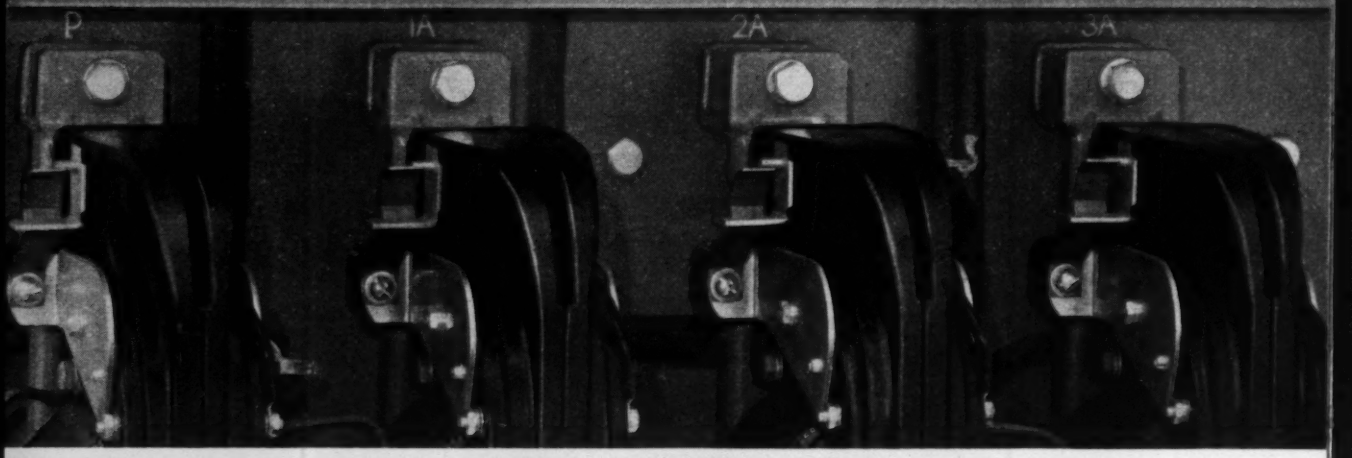
Hydratork drive (Clark's power shifted, automatic transmission) is standard equipment on the CY 20. A companion model, the CFY 20, has a standard transmission with an 11 in., double faced, single disc, dry plate clutch.

The clutch, which is enclosed in a split housing, can be quickly removed by taking off the floor plate and the front load panel. No uncoupling of hydraulic hoses, dismantling of frame, or removal of transmission is involved.

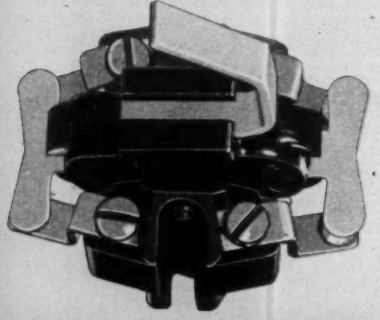
Lift speed on either model is 74 fpm loaded and 91 fpm empty. Lift and tilt of the upright is controlled from one lever mounted on the right

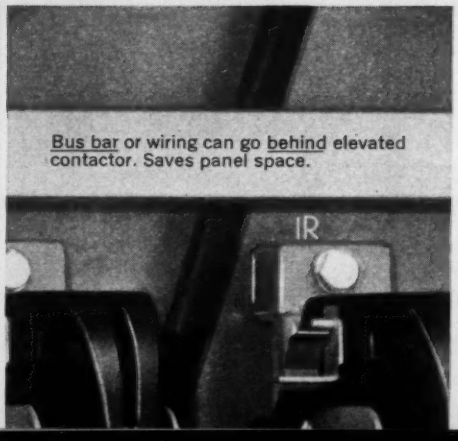
(*Please turn to Page* 84)





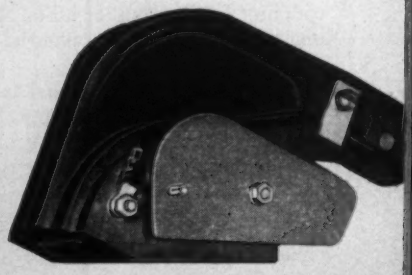
Pre-drilled mounting holes on unit base accommodate electrical interlock assemblies with field convertible contacts.





Bus bar or wiring can go behind elevated contactor. Saves panel space.

New improved arc chute increases contact life.



Now! More compact front wired control panels with new Cutler-Hammer D-c contactors!

Six sizes with new mounting flexibility for the control panel you need: 25, 50, 100, 150, 300, and 600 amperes

Cutler-Hammer's new line of D-c unitized contactors gives you the flexibility of mounting you need . . . in panels built for you by Cutler-Hammer or panels you assemble.

Every contactor is assembled on an insulated steel base, so all that's needed is two bolts to attach it to a steel or slate panel. Wire them from the back or from the front. Surface mount them or elevate them with spacers. Elevated mounting and front wiring give the ultimate in space saving and ease of maintenance.

This rugged new line has been thoroughly tested to give you the typical long-lived performance of all Cutler-Hammer control. Coils are impregnated with epoxy resin for complete protection against moisture and dust. Improved blow-out structure increases contact life even more.

What's new at Cutler-Hammer? The new line of unitized contactors is just another step to keep Cutler-Hammer your best source for heavy duty mill control equipment. Wherever you look you can see the new spirit—in new, better products, new manufacturing facilities, new engineering talent—all designed to serve you better in the big years ahead. Get all the facts about Cutler-Hammer. Ask your Cutler-Hammer distributor, Cutler-Hammer sales office or write direct for Pub. LO-80-U213 which tells about unitized contactors.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

(*Concluded from Page* 81)

side of the steering column (the driver can lift and tilt simultaneously).

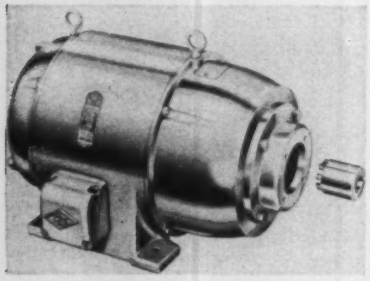
The upright channels are rolled from SAE 1045, fine grain steel. The nested inner upright travels on lifetime lubricated rollers which provide continuous roller contact while the upright is telescoped.

For further information, *write* Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Motors Can Be Tailored To Pump Performance

MOTORS with intermediate ratings permit users to select the correct horsepower required by the performance curve of a hydraulic pump.

You can get these standard intermediate ratings: 2½, 4, 6¼, 8¾, 12½, 17½, 22½, 27½, 32½, 35, 37½, and 45 hp. Other conventional ratings from ½ through 60 hp are available.

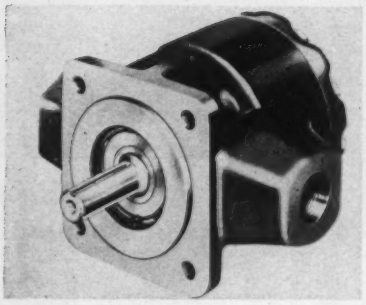


All Reuland, hydraulic, pump mount motors have internal spline couplings. They're available for all makes of flange mounted hydraulic pumps. Types: Polyphase, dripproof, and totally enclosed. Frame sizes range from 182 through 365-U.

For further information, *write* Reuland Electric Co., Alhambra, Calif., or Howell, Mich.

Cartridges Save Time on Fluid Power Pump Changes

A SERIES (PF100) of single and double Dual-Vane pumps with full bearing cam rings and port plates is offered for fluid power systems.



Longer service life, improved performance, and quieter operation are results of a new design, says the company. Cartridge construction permits servicing of the units in minutes; no special tools are required to replace the cartridge or change to a different capacity.

Another feature: All models are internally drained—no external connections are required. The pumps may be driven by a flexible coupling, gear chain, or belt and are designed for industrial and mobile equipment applications. They're suitable for hydraulic presses, scrap balers, plastic molding units, and diecasting machines.

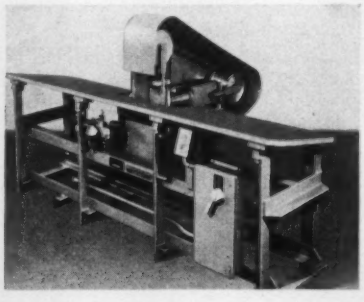
For further information, *write* Hydreco Div., New York Air Brake Co., 9000 E. Michigan Ave., Kalamazoo, Mich.

Backup Belt Extends Life of Abrasive Belt

THE ABRASIVE belt on the Murray-Way machine travels on a resilient, driven backup belt supported at work position by a steel platen.

The company says the setup saves wear and tear on the belt by providing resilience for the cutting grain, and by giving it a moving support as it crosses the steel platen at work position.

The large table top may be used horizontally, or tilted to produce a chamfer or beveled edge on the work. In addition, it may be positioned to provide an angular surface (in relation to a second surface).



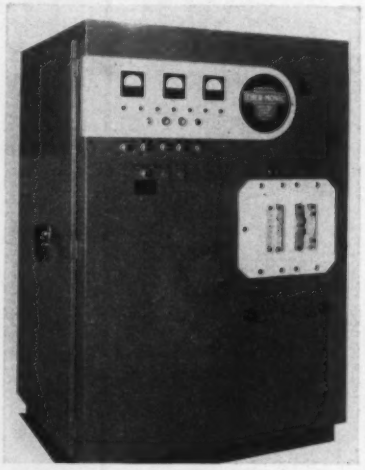
Standard belts can be used on the machine. Belts are easily removed and replaced when necessary. Size of worktable varies with specifications.

For further information, *write* Murray-Way Corp., P. O. Box 180, Birmingham, Mich.

Two Frequency Ranges Produced by Generator

A VERSATILE, 30 kw generator can be operated from 250 to 450 kc, and from 1 to 7 mc.

The controls are built in and are operated externally. Coils and fixtures are mounted in front of the generator for connection to the outputs. No additional cabinets are required. External grid adjustments are possible on both frequencies.



The generator can be adapted to soldering, brazing, annealing, and hardening. A variable output transformer for low frequency operations, and a completely adjustable tank for jobs requiring high frequency heating, are housed in a dusttight cabinet. The generator also comes with a saturable reactor for controlled output, and can be constructed with a Thryton controlled output. Heat exchangers for water and cabinet cooling are built in.

For further information, *write* Induction Heating Corp., 183 Wythe Ave., Brooklyn, N. Y.

NEW literature

Write directly to the company for a copy

Stainless Steel Welding Guide

A six page folder contains a handy chart on the chemical and physical specifications of stainless steel electrodes. Grade of steel, AWS and AISI identifications, principal properties as welded, color codes, and chemical specifications as welded for principal alloying elements are covered. McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.

Alloy Iron Properties

Bulletin No. 158 charts the engineering properties of Meehanite metal, Ni-Resist iron, Ni-Resist Ductile iron, and Ductile iron. Centrifugally Cast Products Div., Shenango Furnace Co., Dover, Ohio.

Data on Cutoff Presses

An eight page bulletin evaluates the merits of a power press designed for the purpose of cutting off roll formed shapes on the fly. Press speeds and accuracy are covered. Federal Press Co., 814 Division St., Elkhart, Ind.

Single Crank Presses

An eight page bulletin (No. 52181) illustrates the Warco line of single action, straight side, single crank presses in capacities from 60 to 400 tons. Federal Machine & Welder Co., Warren, Ohio.

Pump Catalog

A 12 page catalog describes diffusion and booster pumps, and shows speed curves for small, medium, and large models (1 to 32 in. sizes). NRC Equipment Corp., 160 Charlemont St., Newton 61, Mass.

Tubular Steel Products

A six page folder, T-467, contains information on 15 steels used for tubes in high temperature service. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Standard Fasteners Data

Standard fasteners and special developments within the cold headed and screw machine products industry are covered in a brochure. Chelsea Div., Federal Screw Works, 3401 Martin, Detroit, Mich.

Furnace Transformer Bulletin

A 16 page booklet on electric furnace transformers (Bulletin PFT3M960), reviews the basic design principles applied to transformers with high current ratings. It also covers construction details and principal accessories. Power Sales Dept., Pennsylvania Transformer Div., McGraw-Edison Co., Box 330, Canonsburg, Pa.

Torchweld Equipment

Welding torches, cutting attachments, tips, economizers, regulators, and assemblies are described in a 16 page catalog, NTW-110. National Cylinder Gas Div., Chemetron Corp., 840 N. Michigan Ave., Chicago 11, Ill.

Roll Grinding Wheels

Wheel characteristics required for all types of modern roll grinding (including good balance, fast cutting action, and rapid stock removal) are covered in a four page brochure. Macklin Co., Jackson, Mich.

Subminiature Motor Data

Bulletin AWH MO-809 describes a new series of subminiature reversible dc motors. Included are physical and electrical characteristics of the 2 ounce motors in Vanguard II, weather satellite, still in orbit. A. W. Haydon Co., 232 N. Elm St., Waterbury, Conn.

Graphite Electrodes

Data sheets cover typical chemical and physical properties of graphite electrodes in various grades and sizes. Technical Dept., Electrode Div., Great Lakes Carbon Corp., 18 E. 48th St., New York 17, N. Y.

Transductor Manual

A 38 page manual, T-11, describes the characteristics and functions of static transductors, and outlines typical applications. Control Div., Magnetics Inc., Butler, Pa.

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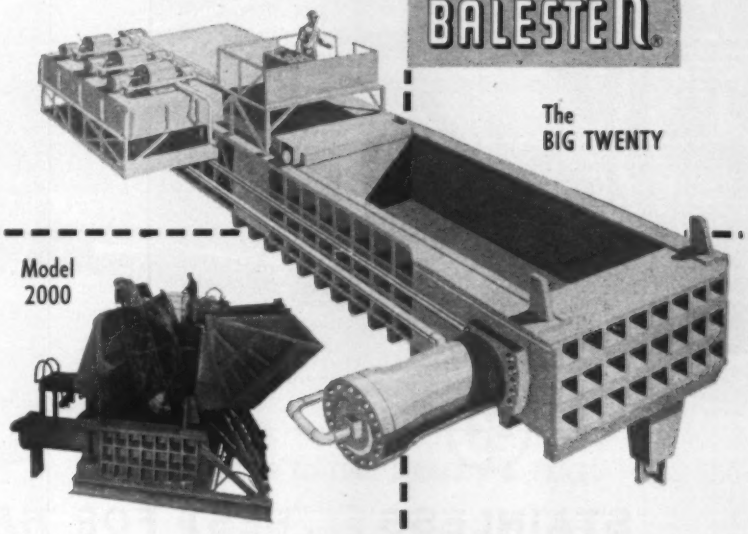

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Little Change Seen for November

LOOK FOR NOVEMBER to bring a modest improvement in steel orders, output, and shipments.

From the threshold, the month looks no better than September or October, but that's because users are waiting until the last minute to place the bulk of their tonnage. As the month progresses, demand is expected to accelerate. Market analysts predict that steelmaking operations will climb to 60 per cent of capacity by Nov. 30 and average about 57 per cent for the month (vs. 54 per cent in October).

SPOTLIGHT ON DETROIT— If November is to improve, steelmakers will need continued strong support from the automotive industry. For the last two months, automakers have almost single handedly sustained the market in the absence of normal demand from appliance manufacturers and other major customers. Now the burden is on car buyers. Unless they continue to purchase the new models at a near record rate, automakers will have to curtail their output.

LESS LIQUIDATION—Hopes for an upturn in November also rest on the assumption that many steel consumers will complete their inventory adjustments and start buying as much metal as they're using.

A few weeks ago, steelmakers thought their customers would reduce inventories by 500,000 to 1 million tons during the fourth quarter. Now they believe that stocks may be cut by as much as 2 million tons. Reason: Inventory reduction has become a fad—Russian roulette for purchasing agents. Buyers are waiting until they're almost out of steel, then gambling that they can get the service they need when they spin the phone dial.

If inventories are cut by 1.5 million to 2 million tons during November and December, they'll drop almost as low as they were at the end of last year's strike (10 million tons). They can fall to that level without causing hardships.

HEDGING COULD HELP— Although most observers see only a gradual upturn for steel in November, there's a remote possibility of a sudden spurt in demand. In the next week or two, some buyers may decide to do some last minute hedging against a price increase that could come on Dec. 1, when industry wage rates go up an average of 8.4 cents an hour.

POSTELECTION PICKUP?— In some quarters, there's hope that the election of a new President will give steel sales a quick boost. Some marketing men believe buyers have been putting off purchases because of political uncertainties.

A victory for Mr. Nixon might reassure businessmen and stimulate investment. A victory for Mr. Kennedy might start a stock market rally based on expectations of higher wages, more government spending, and inflation. Regardless of who goes into the White House, this much is clear: Increased spending for schools, highways, or defense won't have any real impact on steel consumption for months. The immediate benefits will be mainly psychological.

PRODUCTION DROPS— Last week, steelmakers operated their furnaces at 53.2 per cent of capacity, 2.2 percentage points below the previous week's revised rate. Output: About 1,516,000 ingot tons. October's production was 6.9 million tons (vs. 6.4 million tons in September). For ten months, the total is 87.3 million tons (vs. 74.2 million in the strike-affected corresponding period of 1959).

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	90	94
Reinforcing	90	95
Boiler Tubes	...	97
Canada	110	100
Charts:		
Finished Steel	...	93
Ingot Rate	92	...
Scrap Prices	...	103
Clad Steel	...	98
Coal Chemicals	...	100
Coke	...	100
Comparisons	...	93
Container Shipments	92	...
Contracts Placed	110	...
Contracts Pend.	110	...
Electrodes	...	*
Fasteners	...	97
Ferroalloys	...	101
Fluorspar	...	100
Footnotes	...	97
Imported Steel	90	100
Ingot Rates	92	...
Metal Powder	...	100
Nonferrous Met.	106	108
Ores	...	100
Pig Iron	110	99
Piling	...	94
Plates	91	94
Plating Material	...	109
Prestressed Strand	...	97
Price Indexes	...	93
Producers' Key	95	...
R.R. Materials	110	97
Refractories	...	100
Scrap	103	104
Semifinished	...	94
Service Centers	110	99
Sheets	91	95
Silicon Steel	...	96
Stainless Steel	92	98
Steel Shipments	92	...
Strip	91	96
Structurals	110	94
Tin Mill Prod.	...	96
Tool Steel	...	98
Tubular Goods	91	98
Wire	90	96

*Current prices were published in the Oct. 24 issue and will appear in subsequent issues.

Metalworking Week—Page 19

Technical Outlook—Page 63

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West's Steel Take Rises in First Half

STEEL receipts in seven Western states (California, Washington, Oregon, Utah, Arizona, Nevada, Idaho) in the first half of this year averaged 20 per cent higher than they did during 1959, reports W. R. Riggs, commercial research manager for Kaiser Steel Corp., Oakland, Calif.

Since mid-1960, purchases from the mills have dropped substantially due to inventory reductions, but consumption is down only moderately, with the principal use of steel in the area—construction—relatively strong.

Pacific Coast imports, Mr. Riggs points out, were high at 300,000 tons during the first half, but the trend has been downward in recent months.

• **Near Record**—Kaiser Steel's study of the 1959 steel market in the seven states shows consumers' receipts at 6,216,000 tons approached a record and registered an over-all market increase of 12 per cent. California accounted for more than three-quarters of the total tonnage—42 per cent to southern California, 34 per cent to northern California. Oregon and Washington took 15 per cent, and the four remaining states 9 per cent.

An increase of 21 per cent in the Washington-Oregon share reflected strong demand for plates, bars, and hot rolled sheets. Arizona, Utah, Nevada, and Idaho, however, had a below average 5 per cent increase due to lower receipts of plates and reinforcing bars.

• **Foreign Competition**—Last year's steel strike affected traditional lines of supply. Imports, a record 763,000 tons, were more than double those in 1958, accounting for 12 per cent of total western receipts. Much of the gain was at the expense of Eastern mills that supplied only about one-third of Western requirements compared with over 40 per cent during previous years.

Steel service centers accounted for 25 per cent of total Western steel receipts during the year (national average 19 per cent), up substantially from 22 per cent in 1958, and the highest since the 25 per cent registered for 1955. The Western steel fabricating industry accounted for 22 per cent of total receipts last year, the same as in 1958.

Steel Mill Product Receipts in Seven Western States By Region—1959

Net Tons

STEEL MILL PRODUCTS	Total Seven Western States	Southern California	Northern California	Oregon & Washington	Arizona, Utah Nevada & Idaho
Plates					
Sheared Plates	911,000	270,000	372,000	104,000	165,000
Universal Mill Plates	25,000	11,000	6,000	7,000	1,000
Structural Shapes					
Wide Flange Beams	160,000	63,000	43,000	34,000	20,000
Standard Structural Shapes	300,000	106,000	74,000	75,000	45,000
Hot Rolled Bars & Bar Size Shapes					
Carbon	440,000	194,000	118,000	92,000	36,000
Alloy & Stainless	70,000	48,000	15,000	6,000	1,000
Concrete Reinforcing	600,000	250,000	179,000	128,000	43,000
Hot Rolled Sheets	510,000	327,000	91,000	68,000	24,000
Hot Rolled Strip	57,000	27,000	20,000	5,000	5,000
Cold Rolled Sheets	355,000	228,000	104,000	19,000	4,000
Cold Rolled Strip	35,000	25,000	7,000	3,000	....
Standard & Line Pipe					
Pipe ½ - 4 in.	390,000	175,000	100,000	69,000	46,000
Pipe 4½ - 12¾ in.	80,000	43,000	14,000	12,000	11,000
Tin Mill Products	1,120,000	280,000	660,000	160,000	20,000
Galvanized Sheets	300,000	124,000	79,000	47,000	50,000
All Other Mill Products	1,025,000	519,000	250,000	152,000	104,000
Gross Total	6,378,000	2,690,000	2,132,000	981,000	575,000
Adjustment for Conversion*	162,000				
Net Total	6,216,000				

*Steel mill products received by consumers and converted into other mill products have been subtracted from the total to avoid duplication.

Chicago's Steel Imports Down 6% in September

Steel imports into the port of Chicago via the St. Lawrence Seaway were 7310 net tons in September, a 6 per cent decrease from the August figure of 7760 tons, and 61 per cent below the 18,573 tons brought in during September, 1959, reports the Chicago Association of Commerce & Industry.

Imports this year, through September, totaled 53,096 tons, a 67 per cent decrease from the 161,970 tons imported in the comparable 1959 period.

Of the September imports, wire rods accounted for 26 per cent; structural steel, 23; bars, 20; wire and wire products (including nails and staples), 16; nuts, bolts, screws, and washers, 7; tubing and pipe, 4; barbed wire, 1.5; and sheets, 1 per cent.

Of those items, 54.3 per cent was shipped from Antwerp; 18.2 from Rotterdam; 10.8 from Bremen; 3.3 from Gothenburg; 3 from Caen; 2.5, Hamburg; 2.1, London; 1.9 each, Genoa and Manchester, 1.1, Le Havre; 0.5, Glasgow; and 0.2 each, Avonmouth and Marseilles.

Imports at Houston totaled 32,000 tons in September, an increase of 12,000 over the August figures. In September, 1959, the total was 60,700 tons.

Wire . . .

Wire Prices, Pages 96 & 97

Domestic producers of merchant wire products are quoting 30,000 lb minimum truckloads on the same basis as for 40,000 lb carlots. The move is stimulating demand to some extent, although delivery promises remain easy. Shipments on most merchant items can be had from stock. Demand for manufacturers' wire is moderately active, with deliveries ranging three to four weeks.

Steel Bars . . .

Bar Prices, Page 94

Hot rolled carbon bar demand is diversified, but it shows little change in over-all volume. With deliveries ranging two to four weeks, consumers are buying only for immediate needs.

The lag in demand also continues in cold drawn bars, with the carbon grades available from stock in some cases. Both hot and cold alloy bars can be had for relatively early shipment.

New England armament shops are stepping up their requirements for bars. Harrington & Richardson Co., Worcester, Mass., has booked a second order for 70,000 M-14 rifles at $5,310,723. A supplementary inquiry for 105 tons of bars for the Springfield Armory, closing Nov. 7, brings pending volume for that shop to 580 tons. Included are hot rolled gun quality and cold finished annealed bars.

Reinforcing Bars . . .

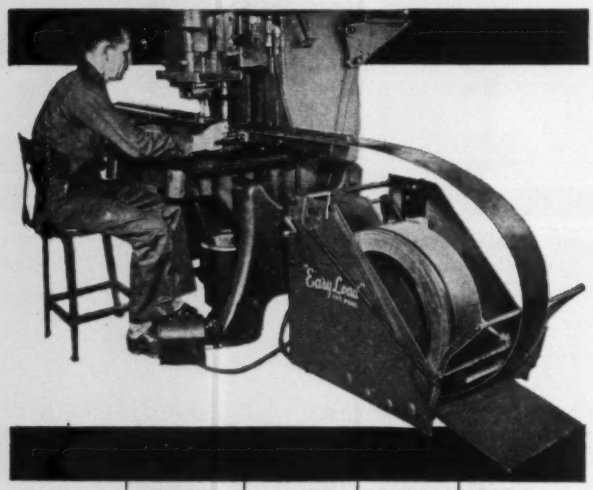
Reinforcing Bar Prices, Page 95

With construction holding up at many points despite the fading building season, reinforcing bars are moving at a brisk pace. Volume is expected to hold up as long as weather permits active building.

A lot of rebars were shipped dur-

reduce set-up time and lower production costs

WITH ROWE 800 SERIES "Easy Load" COIL CRADLES



MODEL	MAXIMUM CAPACITY WEIGHT	MAXIMUM WIDTH CAPACITY	MAXIMUM O.D. CAPACITY	FLOOR SPACE REQUIRED
810	1200#	10"	36"	15" x 30"
815	1200#	15"	36"	20" x 30"
820	1200#	20"	36"	25" x 30"
824	1200#	24"	36"	29" x 30"

When you are *in production* with ROWE "Easy Load" Coil Cradles, you are getting precision coil handling that reduces your set-up time and cuts your costs. Instant coil positioning by means of the adjustable side guide plus positive feeding action puts most materials exactly where it should be without underfeeding or overrunning. All 800 Series "Easy Load" Cradles can be moved from station to station by one man quickly and easily. They work equally well with manual or automatic feeding arrangements. Reduced-friction side guides pay off the coil without binding or scratching.

If you use coil stock for production items, the Rowe "Easy Load" 800 Series Cradle can increase the accuracy, efficiency and economy of your operation.

Investigate the complete ROWE line. Other equipment includes Coil Cradles to 20,000 pound capacity, Straightening machines, Straightening and Feeding Machines, Cabinet Feeds, Roll Feeds, Coil Catchers and Storage Ramps, Combination Cradle and Straightening Machine Units, Coil Buggies, Reels, Conveyors, Stackers and Complete Sheeting Lines.

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811 REGAL ROW DALLAS, TEXAS

ing October, some producing plants operating at, or close to, capacity.

Mesh is being shipped steadily, but releases aren't as strong as those for rebars.

Plates . . .

Plate Prices, Page 94

The outlook for plate demand is enhanced by award of six cargo ships for the United States Lines to the Quincy, Mass., yards of Bethlehem Steel Co. The ships will require 21,600 tons of steel.

Much Navy work is also in early prospect for private shipyards. Bids will be opened Nov. 15 on a steam turbine-powered aircraft carrier costing about $293 million. Bethlehem, New York Shipbuilding, and Newport News Shipbuilding are estimating. In addition, six more Naval contracts are expected to be placed with private yards within the next 60 days, and still others within the next five months.

Total work to be allotted Navy-yards will cost $1,120,000,000 and includes 15 naval vessels and 22 service and landing craft. In addition to the aircraft carrier, outstanding awards will include a nuclear-powered ballistic missile submarine, three guided missile frigates, and two guided missile destroyers. Yards will also be given $70 million in repairwork.

While the outlook for demand on Navy account is promising, plate demand shows only a slight gain, with delivery promises largely unchanged. Sheared plate can be had within two weeks, and alloy plates in three to five weeks.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 95 & 96

Of the major steel products, sheets are in relatively best demand. Little change is noted in delivery promises, however, with hot rolled being offered for shipment within two to three weeks, cold rolled in two to five weeks, and galvanized in three weeks.

There are still no signs of a sustained pickup in demand. Sheetmakers booked about the same volume of business in October as they did in September.

Some consumers are still liquidating inventories, and those who have completed the job are showing no interest in buying ahead, or speculating on a possible price increase Dec. 1, when steel wages go up an average of 8.4 cents an hour. Users appear to be buying only what they need to keep their manufacturing lines running.

Orders from the automotive industry are coming through at a steady rate. Volume is fair, but is less than had been expected.

Tubular Goods . . .

Tubular Goods Prices, Page 98

Imported pipe continues an important factor in the tubular goods market. It is being reflected in curtailed domestic production, notably buttweld pipe. One mill reported its production has dropped from 75 to around 50 per cent of capacity the last few weeks.

Pipe and tubing contracts placed by the Navy General Stores Supply Office, Philadelphia, include: Wrought iron pipe costing $117,022 to A. M. Byers Co.; welded steel

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This 2-KW **Sonogen**® ultrasonic-cleaning installation was designed in collaboration with the Lycoming Division of Avco to handle the toughest jobs in the shop. Planned originally for close-tolerance gas-turbine parts whose complex geometry and heavy scale handicapped old-fashioned cleaning methods, it now works three shifts on air diffusers (photo) and other difficult parts pre-selected for efficient **Sonogen**® cleaning. Repeated cycling in conventional cleaning baths failed to remove all scale, oxide and soil; now the fast, efficient scrubbing action of **Sonogen**® cleans every surface thoroughly without re-cycling / Your problem may be different from Lycoming's, but the solution is probably the same — a **Sonogen**® ultrasonic-cleaning system engineered for your needs. Write today, giving us full details.

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tubing costing $57,674 to Standard Tube Co., Detroit; welded steel tubing costing $112,080 to the National Tube Div., U. S. Steel Corp., Pittsburgh; steel tubing costing $25,368 to Babcock & Wilcox Co., Alliance, Ohio.

The latest weekly survey of Hughes Tool Co. showed 1895 rotary oil drilling rigs operating in the U. S. and Canada. The total of 1737 for the U. S. was down 52 from the preceding week, while the total of 158 active rigs in Canada was off only one.

Tin Can Shipments Rise Sharply During August

Shipments of tin plate cans in August totaled 600,601 tons vs. 453,177 in July this year and 614,967 in August, 1959, reports the Census Bureau. Shipments in the first eight months this year were 3,168,098 tons vs. 3,309,046 in the same 1959 period.

Stainless Steel . . .

Stainless Steel Prices, Page 98

Retail sales of stainless products this year will exceed $500 million, L. R. Larson, vice president, International Nickel Co. Inc., New York, predicted last week. He said 61 major U. S. department stores (representing 141 main stores and branches) will participate in International's 1961 promotion of nickel stainless steel housewares and appliances.

Sales at the retail level were estimated at more than $400 million in 1959, but that figure was low.

The primary goal of Inco's 1961 promotion will be to stimulate the establishment of stainless steel shops in leading department stores. Clyde E. Roberts, chairman, Committee of Stainless Steel Producers, American Iron & Steel Institute, said efforts to "achieve the objectives of the stainless steel industry in developing the market for stainless steel consumer goods, have been greatly enhanced" by International Nickel's promotions in 1959 and 1960. The 1961 promotion promises to be even more successful than the previous ones.

Eastern Stainless Steel Corp., Baltimore, was awarded a contract for 155 tons of stainless sheets costing $192,457. The contract came from the Navy General Stores Supply Office, Philadelphia. It also placed 130 tons of aluminum alloy sheets costing $95,856 with Gerard Daniel Supply Corp., New Rochelle, N. Y.

Shipments of Steel Products—August, 1960

(Net tons; all grades)

Products:	Carbon	Alloy	Stainless	Total	First Eight Months
Ingots	10,393	9,577	1,373	21,343	255,285
Blooms, etc.	67,623	22,959	1,237	91,819	1,085,639
Tube rounds	793	341	12	1,146	12,792
Skelp	4,365	.....	.....	4,365	88,916
Wire rods	62,834	1,308	813	64,955	668,065
Shapes	309,591	6,048	26	315,665	3,549,609
Piling	32,407	.....	.....	32,407	299,258
Plates	333,877	32,519	3,488	369,884	4,592,486
Rails—standard	34,038	.....	.....	34,038	587,528
Rails—other	4,470	.....	.....	4,470	35,071
Joint bars	1,684	.....	.....	1,684	22,570
Tie plates	10,694	.....	.....	10,694	111,950
Track spikes	2,954	.....	.....	2,954	36,951
Wheels	16,625	15	.....	16,640	182,915
Axles	5,863	1	.....	5,864	84,055
Bars—hot rolled	347,090	103,245	2,917	453,252	5,119,908
Bars—reinforcing	222,708	.....	.....	222,708	1,443,600
Bars—cold drawn	67,823	18,827	3,959	90,609	1,053,136
Tool steel	613	5,103	.....	5,716	63,649
Standard pipe	162,378	131	.....	162,509	1,526,829
Oil country goods	61,922	16,017	.....	77,939	870,208
Line pipe	246,514	4	.....	246,518	2,033,113
Mech. tubing	32,834	15,331	539	48,704	571,337
Pressure tubing	16,834	4,738	1,399	22,971	186,978
Drawn wire	191,781	2,746	1,674	196,201	1,719,182
Nails & staples	29,482	.....	1	29,483	232,864
Barbed wire	3,550	.....	.....	3,550	34,110
Woven fence	7,341	.....	.....	7,341	81,145
Bale ties, etc.	6,699	.....	.....	6,699	54,532
Black plate	44,682	.....	.....	44,682	431,131
Tin plate—HD	38,599	.....	.....	38,599	306,896
Tin plate—electro	472,209	.....	.....	472,209	3,924,544
Sheets—HR	491,105	13,426	1,744	506,275	5,887,836
Sheets—CR	981,725	2,456	10,162	994,343	10,670,630
Sheets—galvanized	227,485	.....	.....	227,485	2,268,418
Sheets—other	18,803	.....	.....	18,803	187,631
Elec. sheets—strip	1,964	35,033	.....	36,997	414,839
Strip—HR	84,231	1,257	296	85,784	967,980
Strip—CR	78,437	1,562	14,649	94,648	970,397
Totals (1960)	4,735,020	292,644	44,289	5,071,953	52,633,983
Totals (1959)	1,200,947	116,609	21,053	1,338,609	53,657,363

Data from American Iron & Steel Institute.

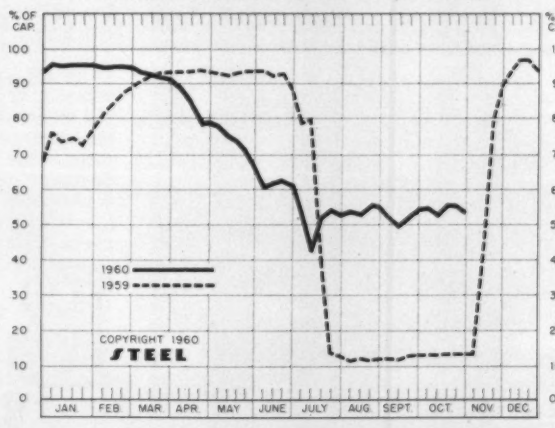
DISTRICT INGOT RATES

(Percentage of capacity utilized)

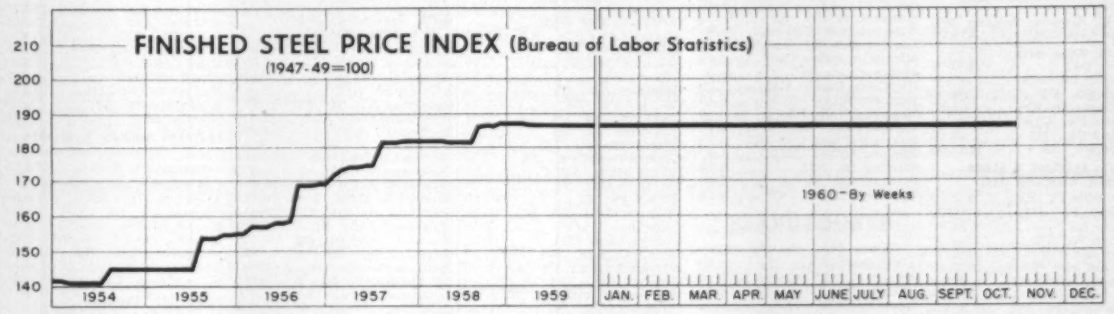
	Week Ended Oct. 30	Week Ago	Month Ago	Year Ago
Northeastern	56	59	65	*
Buffalo	61	60	42	*
Pittsburgh	47	49	46	*
Youngstown	42	44	46	*
Cleveland	57	57	59	*
Detroit	69	71	67	*
Chicago	56	60	59	*
Cincinnati	61	62	61	*
St. Louis	74	73	79	*
Southern	46	51	49	*
Western	49	54	54	*
Total Industry	53.2	55.4	54.7	13.1
Index (1947-49=100)	94.4	98.3	97.0	23.1
Net Tons (In thousands)	1,516	1,579	1,558	371

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute. *Not available due to general strike.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Oct. 25, 1960	Week Ago	Month Ago	Oct. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 25

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloys, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.489
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe, Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	195.395
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed(80-rod spool)	8.414
		Woven Wire Fence (20-rod roll)	21.003

STEEL's FINISHED STEEL PRICE INDEX

	Oct. 26 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	208.90
Index in cents per lb	6.713	6.713	6.713	6.713	5.661

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.14
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65 99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	30.17	30.17	31.33	44.33	45.00

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 26 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.97	5.965	5.965	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.74	5.74	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.50
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.50
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb)box,Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, ½-⅝" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton	Oct. 26 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.07	70.07	70.41	62.16
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry. deld., Phila.	70.68	70.57	70.57	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.),deld.,Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$28.50	$28.50	$30.50	$44.50	$44.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	35.00	45.00	46.50
No. 1 Heavy Melt, Chicago	28.00	28.00	28.50	43.50	44.00
No. 1 Heavy Melt, Valley	27.50	27.50	31.50	44.50	48.00
No. 1 Heavy Melt, Cleve.	25.50	25.50	29.50	41.50	45.50
No. 1 Heavy Melt, Buffalo	27.50	27.50	29.50	33.50	38.50
Rails, Rerolling, Chicago	46.50	48.00	52.50	64.50	65.50
No. 1 Cast, Chicago	36.50	36.50	38.50	57.50	47.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.625
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	26.25

Steel Prices

Mill prices as reported to STEEL, Oct. 26, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 95; footnotes, page 97.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $76.00

INGOTS, Alloy (NT)
Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Bartonville,Ill. K4 .... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 .... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 .... 80.00
Lackawanna,N.Y. B2 .. 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 .... 80.00
S.Chicago,Ill. R2, U5 .. 80.00
S.Duquesne,Pa. U5 .... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 .... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 .. 104.50
Ensley,Ala T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 .... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 .... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 .... 99.50
Lackawanna,N.Y. B2 .. 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 .... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 .. 99.50
S.Duquesne,Pa. U5 .. 99.50
S.SanFrancisco B3 .. 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 .. $119.00
Bridgeport,Conn. C32 .. 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 .... 119.00
Conshohocken,Pa. A3 .. 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 .... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 .... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 ... 119.00
Johnstown,Pa. B2 .... 119.00
Lackawanna,N.Y. B2 .. 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 .... 119.00
Seattle(6) B3 ..... 140.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 .. 119.00
S.Duquesne,Pa. U5 .. 119.00
Struthers,O. Y1 .... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2,W14 .. 122.50
S.Duquesne,Pa. U5 .... 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Benwood,W.Va. W10 .... 5.05
Ind.Harbor,Ind. Y1 .... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 .... 5.05

WIRE RODS
AlabamaCity,Ala. R2 .. 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 .. 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 .... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 .... 6.65
Monessen,Pa. P7 ..... 6.40
Pittsburg,Calif. C11 .. 7.20
Portsmouth,O. P12 .... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 .. 6.40
SparrowsPoint,Md. B2 .. 6.50
Sterling,Ill.(1) N15 .... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 .... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind I-2, Y1 .. 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 .... 5.60
Lackawanna,N.Y. B2 .. 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 .... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 .... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 .. 5.50
S.SanFrancisco B3 .... 6.15
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 .... 6.20
Weirton,W.Va. W6 .... 5.50

Wide Flange
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 .... 6.45
IndianaHarbor,Ind. I-2.. 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 .... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N15 ..... 5.50
Weirton,W.Va. W6 .... 5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14.. 6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1.. 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 .... 8.15
Lackawanna,N.Y. B2 .. 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14.. 8.05
S.SanFrancisco B3 .... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ..... 8.10
Ind Harbor,Ind. I-2 .... 8.05
Lackawanna,N.Y. B2 .. 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .... 5.55
Ind.Harbor,Ind. I-2 .... 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 .. 5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 .... 6.50
Lackawanna,N.Y. B2 .. 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 .. 6.50
Weirton,W.Va. W6 .... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ... 5.30
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 ... 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 .. 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 .... 5.40
Harrisburg,Pa. P4 .... 5.30
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1.. 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 .. 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 .... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 .. 5.30
SparrowsPoint,Md. B2 .. 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 .... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown(27) R2 .... 5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ..... 7.05
Fontana,Calif. K1 .... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 .... 7.05
SparrowsPoint,Md. B2 .. 7.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.90
Coatesville,Pa. L7 .... 7.95
Conshohocken,Pa. A3 ... 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 .. 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1.. 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14.. 7.95
SparrowsPoint,Md. B2 .. 7.95
Sterling,Ill. N15 ..... 7.625
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 .... 7.95

PLATES, Alloy
Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. P4 ..... 7.50
Coatesville,Pa. L7 .... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 .... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Pa. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14.. 7.50
SparrowsPoint,Md. B2 .. 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Claymont,Del. P4 .... 6.375
Conshohocken,Pa. A3 .. 6.375
Ind Harbor,Ind. I-2 .... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 .... 6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ... 5.55
Ashland l.c.l.(15) A10 .. 6.05
Cleveland c.l. R2 ..... 6.05
Warren,O. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ... 5.675
Aliquippa,Pa.(9) J5 ... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 .. 5.675
Birmingham(9) C15 .... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 .... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 .... 5.675
Emeryville,Calif. J7 .. 6.425
Fairfield,Ala.(9) T2 .. 5.675
Fairless,Pa.(9) U5 .... 5.825
Fontana,Calif.(9) K1 .. 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1.. 5.675
Johnstown,Pa.(9) B2 .. 5.675
Joliet,Ill. P2 ..... 5.675
KansasCity,Mo.(9) S5.. 5.925
Lackawanna(9) B2 .... 5.675
LosAngeles(9) B3 .... 6.375
Massillon,O.(23) R2 .... 6.15
Midland,Pa.(23) C18 .. 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Owensboro,Ky.(9) G8 .. 6.025
Pittsburg,Calif.(9) C11.. 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 .... 6.425
Riverdale,Ill.(9) A1 .... 5.675
Seattle(9) A24,B3,N15 .. 6.425
S.Ch'e'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5.. 5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15.. 5.675
Sterling,Ill.(9) N15 .... 5.775
Struthers,O.(9) Y1 .... 5.675
Tonawanda,N.Y. B12 .. 5.675
Torrance,Calif.(9) C11 .. 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2,U5.. 5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 .. 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Fairless,Pa. U5 ..... 6.875
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 .... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .... 6.725
KansasCity,Mo. S5 .... 6.975
Lackawanna,N.Y. B2 .. 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 .... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14.. 6.725
S.Duquesne,Pa. U5 .... 6.725
Strutthers,O. Y1 .... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 .... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 .... 8.55
Lackawanna,N.Y. B2 .. 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14.. 8.30
S.Duquesne,Pa. U5 .... 8.30
S.SanFrancisco B3 .... 9.05
Sterling,Ill. N15 ..... 7.925
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 .. 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5.. 5.925
Lackawanna(9) B2 .... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 .... 5.675
Tonawanda,N.Y. B12 .. 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 .... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 .... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2 , S30 .. 11.75*
Alloy
Ambridge,Pa. W18 .. 10.175
BeaverFalls,Pa. M12.. 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 ..... 10.35
*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 .. 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 .... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2.. 7.65
Hartford,Conn. R2 ..... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 .... 9.10
LosAngeles(49) P2, R2.. 9.10
Mansfield,Mass. B5 .... 8.20
Massillon,O. R2, R8 .... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 .. 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 .... 7.90
Putnam,Conn. W18 .... 8.20
Readville,Mass. C14 .... 8.20
Seattle(49) S30 ..... 9.10
S.Chicago,Ill. W14 .... 7.65
SpringCity,Pa. K3 .... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 .. 8.15
Youngstown F3, Y1 .... 7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.. 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .... 9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .... 9.025
Bridgeport,Conn. C32 .. 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 .... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 .. 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 ..... 9.025
Hammond,Ind. J5, L2.. 9.025
Hartford,Conn. R2 .... 9.325
Harvey,Ill. R5 ..... 9.025
Lackawanna,N.Y. B3.. 9.025
LosAngeles P2, S30 .. 11.00
Mansfield,Mass. B5 .... 9.325
Massillon,O. R2, R8 .... 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 .... 9.225
S.Chicago,Ill. W14 .... 9.025
SpringCity,Pa. K3 .... 9.20
Struthers,O. Y1 ..... 9.025

Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ...5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Mimequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt) B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.)L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 .....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 .5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3, ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 ....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinaFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ....6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinaFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 ....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ...7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co, Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U .S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala. (27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover O, G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Cleveland A7	15.55
Carnegie,Pa. S18	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (FERROLITE)¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless,Pa. U5	6.20	6.35	6.50	6.65
Gary,Ind. U5	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 1.50

Common Coke	lb	lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts..Calif. C11	11.05	11.30
Sp.Pt.Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.85
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

	Grain Oriented				
C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Millbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass.A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes	**Col.**
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)	
Wheeling,W.Va. W10	$10.10

POLISHED STAPLES	**Col.**
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No, 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

WIRE (16 gage)	**An'ld Stone**	**Galv. Stone**
Ala.City,Ala.R2	17.85	19.40**
Ali'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	----
Cleveland A7	17.85	----
Craw'sville M8	17.95	19.80†‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65‖
Kan.City,Mo. S5	18.10	----
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75‖
Waukegan A7	17.85	19.40†
Worcester A7	18.15	----

WIRE, Merchant Quality (6 to 8 gage)	**An'ld Galv.**
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325‖
Atlanta(48) A11	9.00 9.75*
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Chicago W13	9.00 9.55**
Cleveland A7	9.00 ----
Crawfordsville M8	9.10 9.80*†
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675‖
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625‖
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35‖
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48) B2	9.10 9.775‖
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. ‖10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FENCE POSTS	**Col.**
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed	**Col.**
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190‖
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‖
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‖
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198‖
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.	**Col.**
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190‖
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190‖
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts. 1020 steel bright and high carbon heat treated. ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50

Hot Galvanized and Zinc Plated:

Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50

Hot Galvanized and Zinc Plated:

Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50

Hot Galvanized and Zinc Plated:

Packaged	43.75
Bulk	50

CAP AND SETSCREWS,	**Col.**
Fillister Head, Cap Screws, Coarse Thread:	
Packaged	+55
Bulk	+16
Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38
Setscrews, Square Head, Cup Point, Coarse Thread: Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in., larger 12.85 7/8 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c. for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R.. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Tech-Alloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	66.00	66.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	8.66	10.06	....	8.28	8.55	11.80	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.65	9.80	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.48
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	8.57	9.88	11.24	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	8.83	10.46	10.50	52.00	11.11	8.86	11.01	16.23	9.47	8.78	10.94
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.80
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	8.95	11.20	11.45	61.27	10.65	9.00	14.20	17.35	9.90	8.40	11.15
Memphis, Tenn.	9.84	10.05	....	....	10.64	9.82	12.74	....	9.16	8.66	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	8.92	10.55	10.50	....	10.90	8.90	11.15	16.45	9.26	8.76	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.06
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.06
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.88	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	8.77	10.58	10.53	....	10.94	8.77	11.28	16.33	9.14	8.62	10.91
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.80	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 & 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa.; Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $133; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines; Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ⅜ in. and up	12.85
Fines, under ⅛ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.75-20.00
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48%	3:1	$34.00-35.00†
48%	no ratio	25.00-26.00†

South African Transvaal

44%	no ratio	18.75†
48%	no ratio	24.00-26.00†

Turkish

48%	3:1	36.00-37.00†

Domestic

Rail nearest seller

18%	3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon 5/32" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (Carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill (Per Base Box; **Products** 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots (per keg)	
400 keg min.	$8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ¼ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0

	Dollars
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	*37.60*
Bronze powder, 90/10	*55.20*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types	0.78-1.06
Nickel-Silver	*58.80*
Solder	*8.00**
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	*24.70*
Cobalt: 98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten: Carbon and hydrogen reduced, 98.8% min., minus 65 mesh	nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.35
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	....	$5.65	$5.50	$5.85
Bar Size Angles	5.95	....	5.85	5.70	6.05
Structural Angles	5.95	....	5.65	5.50	5.85
I-Beams	5.70	....	5.60	5.45	5.80
Channels	5.70	....	5.60	5.45	5.80
Plates (basic bessemer)	5.85	....	5.75	5.60	5.95
Sheets, H.R.	Nom.	....	Nom.	Nom.	Nom.
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	Nom.	....	Nom.	Nom.	Nom.
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	....	24.70	24.70	25.50
Barbed Wire (†)	6.25	....	6.15	6.00	6.35
Merchant Bars	5.95	....	5.85	5.70	6.05
Hot-Rolled Bands	6.20	....	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	....	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	....	6.35	6.35	6.70
Bright Common Wire Nails (‡)	7.25	....	7.15	7.00	7.35

*Books closed for 1960-61 shipping season. †Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or truck, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa. 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices. 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Deliveerd.

Charge Chrome: Cr 50-56%, C 6-8%, Si 4-7%, 22.00c; Cr 58-63%, C 5.8%, Si 3-6%, 22.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 53-63%, C 3-5%, Si 2.5% max, 26.00c per lb of contained Cr, delivered in carlots, lump, bulk.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 33.50c per lb contained Cr; 0.010% max, 34.50c. Delivered.

Cr, 65-71%, carload, lump, bulk, 0.025% max, 35.00c; 0.05% max, 34.00c; 0.10% max, 33.75c; 0.20% max, 33.50c; 0.50% max, 33.25c; 1.0% max, 33.00c; 1.5% max, 32.75c; 2.0% max, 32.50c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max), 8M x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 24.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 24.50c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 26.25c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9 25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carboritam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb, (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50, (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

WAREHOUSE OPERATIONS

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Warehouse operational efficiency is contingent in no small way upon material handling efficiency.

Euclid overhead cranes are contributing more and more to the speed up in flow of materials in and out of today's warehouses.

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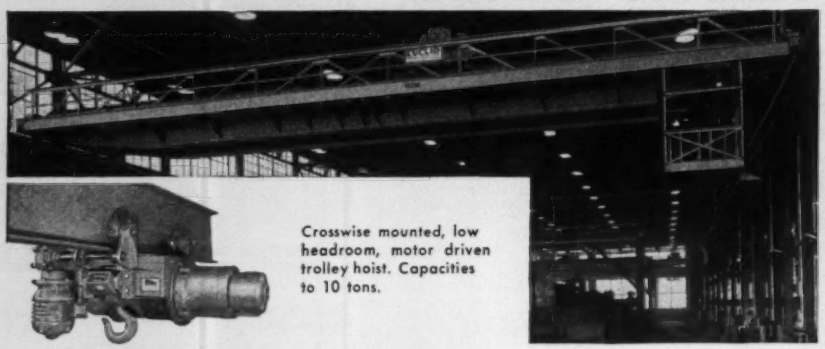

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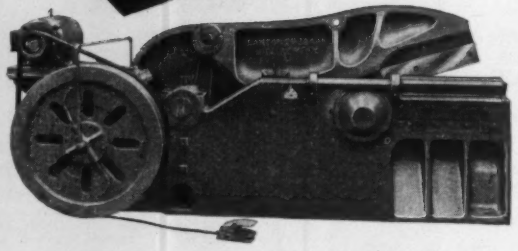

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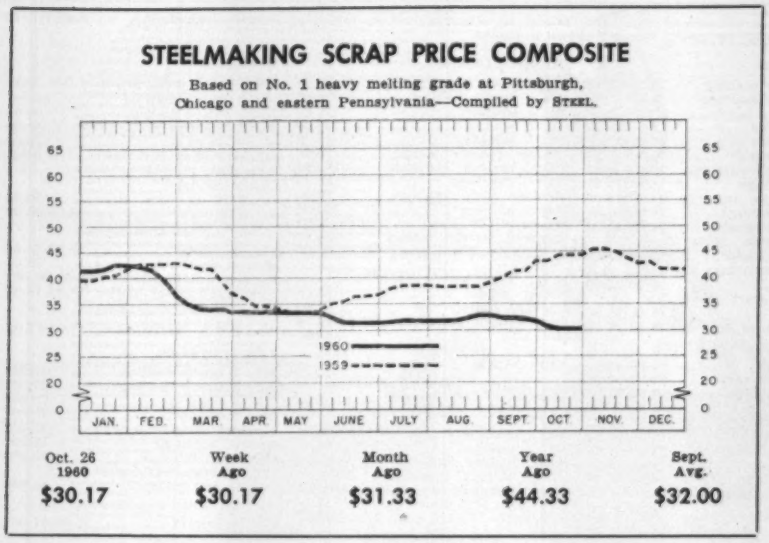


Scrap Resisting Further Decline

STEEL's composite on No. 1 heavy melting grade holds unchanged at $30.17 for third straight week. Outlook for early demand pickup unpromising with steel rate off

Scrap Prices, 104

● **Pittsburgh**—Trading is at a standstill, and prices are unchanged. Consumers are showing no interest in scrap, although they'll readily admit that several grades have probably touched bottom. The continued outpouring of industrial scrap into a weak market is expected to drive brokers' bids on No. 1 factory bundles to lower levels.

● **Philadelphia** — Domestic demand for scrap remains quiet, and prices have eased further. No. 1 bundles and No. 1 busheling are off $1 to $35, delivered. No. 2 bundles and electric furnace bundles are also down $2. No. 2 bundles are quoted at $20, electric furnace bundles $36, delivered. Heavy turnings are off nominally to $36.

● **New York**—Brokers have reduced their buying prices $1 a ton on three steel tonnage items, now offering $29-$30 for No. 1 heavy melting and No. 1 bundles, and $15-$16 for No. 2 bundles. They have also dropped their prices $5 on Type 410 stainless sheets, clips, and solids to $50-$55.

● **Chicago**—Light mill purchases of scrap have been made at the currently quoted prices, but the market's tone appears weaker. Consumers and sellers are waiting for bids on about 29,000 tons of No. 1 factory bundles (offered for November by two district auto stamping plants) to point the way for prices. The tonnage is the largest produced in some months and speculation is that the bids will be a trifle lower than the $31.25 delivered which was accepted for the bulk of the October tonnage.

● **Cleveland**—The trade is awaiting the outcome of bidding on month-end auto lists for a clue to the market trend in the weeks immediately ahead. With steelmaking operations still in a rut (57 per cent at Cleveland and 42 per cent in Youngstown), factors for a return of price strength are lacking. However, with No. 1 heavy melting dealer scrap quoted nominally around $25 a ton, it's thought the market can't be far from bottom.

● **Buffalo**—Surplus stocks are rising in this area, increasing the pressure on the price structure.

● **Cincinnati**—Prices are off another 50 cents to $1 a ton on the No. 1 grades of scrap. A district mill is expected to enter the market for limited tonnage shortly, but it's uncertain whether a second area mill will re-enter the market after an absence of two months. Brokers are quoting $24-$25 on No. 1 heavy melting.

● **St. Louis**—Scrap prices continue to slide in a weak market. Little buying is being done, and prospects are not promising for an early upturn with steelmaking operations showing little change.

● **Birmingham**—While prices have declined recently, district brokers say the over-all market in this area is holding up better than at other consuming points. That's mainly because local foundries are operating at a fairly high level. However, last week the cast iron grades slipped a couple dollars a ton.

● **Houston**—The market continues slow, with no sign of an upturn in the near future. A leading Texas mill says it doesn't expect to buy any additional scrap the rest of this year.

Export prices have fallen slightly. A Mexican mill is paying $1 to $2 a ton more than the domestic price of $29 for No. 2 heavy melting steel, delivered the border at Laredo, Brownsville, and Eagle Pass, Tex.

● **San Francisco**—While the mills continue to withhold purchases, the local market is getting some strength from exports, which still command a premium price over the posted quotations of the mills.

● **Seattle** — Prices continue un-

(*Please turn to Page* 110)

FOR SALE

One new Electric Arc Furnace Charging Bucket Including Bale
Type: Cable Operated—Clamshell
Capacity: 1486 Cu. ft. = 55 tons
Max Dia Closed: 17'-9"
Max Dia Opened: 18'-8"
Max Dia Bottom Opening 12'-6"
Distance from Eye of Bale to Bottom of Bucket Open and closed 14'-0"
Weight: 48,000 lbs.

Reply to Box #875, STEEL Penton Bldg., Cleveland 13, Ohio

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Oct. 26, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 26	$30.17
Oct. 19	30.17
Sept. Avg.	32.00
Oct. 1959	44.00
Oct. 1955	45.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	24.00-25.00
No. 1 dealer bundles	30.00-31.00
No. 2 bundles	23.00-24.00
No. 1 busheling	29.00-30.00
No. 1 factory bundles	34.00-35.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	*33.00-34.00*
3 ft and under	*32.00-33.00*
Heavy turnings	27.00-28.00
Punchings & plate scrap	*35.00-36.00*
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	32.00-33.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	36.00-37.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 2 ft and under	48.00-49.00
Rails, 18 in. and under	49.00-50.00
Random rails	44.00-45.00
Angles, splice bars	40.00-41.00
Railroad specialties	38.00-39.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	29.00-30.00
No. 1 hvy melt., dealer	26.00-27.00
No. 2 hvy melting	24.00-25.00
No. 1 factory bundles	31.00-32.00
No. 1 dealer bundles	27.00-28.00
No. 2 bundles	16.00-17.00
No. 1 busheling, indus.	*29.00-30.00*
No. 1 busheling, dealer	26.00-27.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.00-14.00
Shovel turnings	13.00-14.00
Cast iron borings	13.00-14.00
Cut structurals, 3 ft.	30.00-31.00
Punchings & plate scrap	32.00-33.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Unstripped motor blocks	28.00-29.00
Clean auto cast	41.00-42.00
Drop broken machinery	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
R.R. malleable	40.00-41.00
Rails, 2 ft and under	42.00-43.00
Rails, 18 in. and under	43.00-44.00
Angles, splice bars	37.00-38.00
Axles	48.00-49.00
Rails, rerolling	*46.00-47.00*

Stainless Steel Scrap

18-8 bundles, solids	160.00-165.00
18-8 turnings	80.00-85.00
430 bundles & solids	*75.00-80.00*
430 turnings	40.00-45.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*19.00-20.00*
No. 2 heavy melting	*14.00-15.00*
No. 1 bundles	*21.00-22.00*
No. 2 bundles	*11.00-12.00*
No. 1 busheling	*18.00-19.00*
Machine shop turnings	7.00-8.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	9.00-10.00

Cast Iron Grades

No. 1 cupola	*30.00-31.00*
Stove plate	*24.00-25.00*
Heavy breakable	*24.00-25.00*
Unstripped motor blocks	*18.00-19.00*
Charging box cast	*24.00-25.00*
Clean auto cast	*39.00-40.00*

CLEVELAND

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	19.00-20.00
No. 1 factory bundles	*27.00-28.00*
No. 1 bundles	25.00-26.00
No. 2 bundles	16.00-17.00
No. 1 busheling	25.00-26.00
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	29.00-30.00
Cut structurals, plate 2 ft and under	32.00-33.00
Low phos. punchings & plate	27.00-28.00
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	26.50-27.50

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	29.00-30.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	28.00-29.00
Brake shoes	35.00-36.00
Clean auto cast	43.00-44.00
Burnt cast	34.00-35.00
Drop broken machinery	44.00-45.00

Railroad Scrap

R.R. malleable	45.00-46.00
Rails, 2 ft and under	46.00-47.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	40.00-41.00
Cast steel	32.00-33.00
No. 1 railroad cast	43.00-44.00
Railroad specialties	37.00-38.00
Angles, splice bars	39.00-40.00
Rails, rerolling	51.00-52.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	75.00-80.00
430 turnings	20.00-30.00†

YOUNGSTOWN

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	20.00-21.00
No. 1 busheling	27.00-28.00
No. 1 bundles	27.00-28.00
No. 2 bundles	17.00-18.00
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	27.00-28.00
Electric furnace bundles	27.00-28.00

Railroad Scrap

No. 1 R.R. heavy melt.	29.00-30.00

BUFFALO

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	27.00-28.00
No. 2 bundles	19.00-20.00
No. 1 busheling	27.00-28.00
Shovel turnings	15.00-16.00
Machine shop turnings	11.00-12.00
Cast iron borings	13.00-14.00
Low phos. structurals and plate, 2 ft and under	35.00-36.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	39.00-40.00
No. 1 machinery	46.00-47.00

Railroad Scrap

Rails, random lengths	39.00-40.00
Rails, 3 ft and under	45.00-46.00
Railroad specialties	38.00-39.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*24.00-25.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	*24.00-25.00*
No. 2 bundles	16.00-17.00
No. 1 busheling	*24.00-25.00*
Machine shop turnings	8.00-9.00
Mixed borings, turnings	8.00-9.00
Shovel turnings	11.00-12.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	33.00-34.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable cast	29.00-30.00
Charging box cast	35.00-36.00
Drop broken machinery	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*29.00-30.00*
Rails, 18 in. and under	*45.00-46.00*
Rails, random lengths	*37.00-38.00*

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	*35.00*
No. 2 bundles	*20.00*
No. 1 busheling	*35.00*
Electric furnace bundles	*36.00*
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	15.00
Heavy turnings	*26.00†*
Structurals & plates	*37.00-39.00*
Couplers, springs, wheels	39.00
Rail crops, 2 ft & under	48.00-50.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	*37.00*
Drop broken machinery	48.00-49.00
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	21.00-22.00
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*15.00-16.00*
Machine shop turnings	6.00-7.00†
Mixed borings, turnings	7.00-8.00†
Shovel turnings	8.00-9.00†
Low phos. structurals & plates	33.00-34.00†

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-31.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	*50.00-55.00*
430 sheets, clips, solids	60.00-65.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*23.00-24.00*
No. 2 heavy melting	*19.00-20.00*
No. 1 bundles	*23.00-24.00*
No. 1 busheling	24.00-25.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	29.00-30.00
No. 2 bundles	20.00-21.00
No. 1 busheling	*29.00-30.00*
Cast iron borings	10.00-11.00
Machine shop turnings	17.00-18.00
Shovel turnings	19.00-20.00
Bar crops and plate	36.00-37.00
Structurals & plate	36.00-37.00
Electric furnace bundles	31.00-32.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Stove plate	*45.00-46.00*
Unstripped motor blocks	*33.00-34.00*
No. 1 wheels	*34.00-35.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	39.00-40.00
Angles, splice bars	37.00-38.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*28.00*
No. 2 heavy melting	26.00
No. 1 bundles	30.00
No. 2 bundles	19.00
No. 1 busheling	30.00
Machine shop turnings	7.50
Shovel turnings	9.50

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	35.00
Heavy breakable cast	33.00
Unstripped motor blocks	35.00
Clean auto cast	*40.00*
Stove plate	36.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00
Rails, random lengths	*35.00*
Rails, rerolling	*48.00*
Rails, 18 in. and under	*38.00*
Angles, splice bars	*35.00*

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	34.00†
No. 2 heavy melting	29.00
No. 1 bundles	32.00
No. 2 bundles	*20.00*
Machine shop turnings	nom.
Low phos. plate & structurals:	
3 ft	35.00
2 ft and under	38.00-39.00

Cast Iron Grades

No. 1 cupola	34.00-34.50
Heavy breakable	25.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	28.00-28.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

LOS ANGELES

No. 1 heavy melting	30.00*
No. 2 heavy melting	27.00†
No. 1 bundles	25.00*
No. 2 bundles	17.00-19.00*
Machine shop turnings	12.00†
Shovel turnings	13.00†
Cast iron borings	13.00†
Cut structurals and plate 1 ft and under	44.00†

Cast Iron Grades

No. 1 cupola	39.00-44.00†

Railroad Scrap

No. 1 R.R. heavy melt.	40.00†

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 2 bundles	21.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 2 (prepared for shears)	30.00
No. 1 hvy (unprepared)	35.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	33.00
No. 1 (prepared for shears)	33.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	36.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

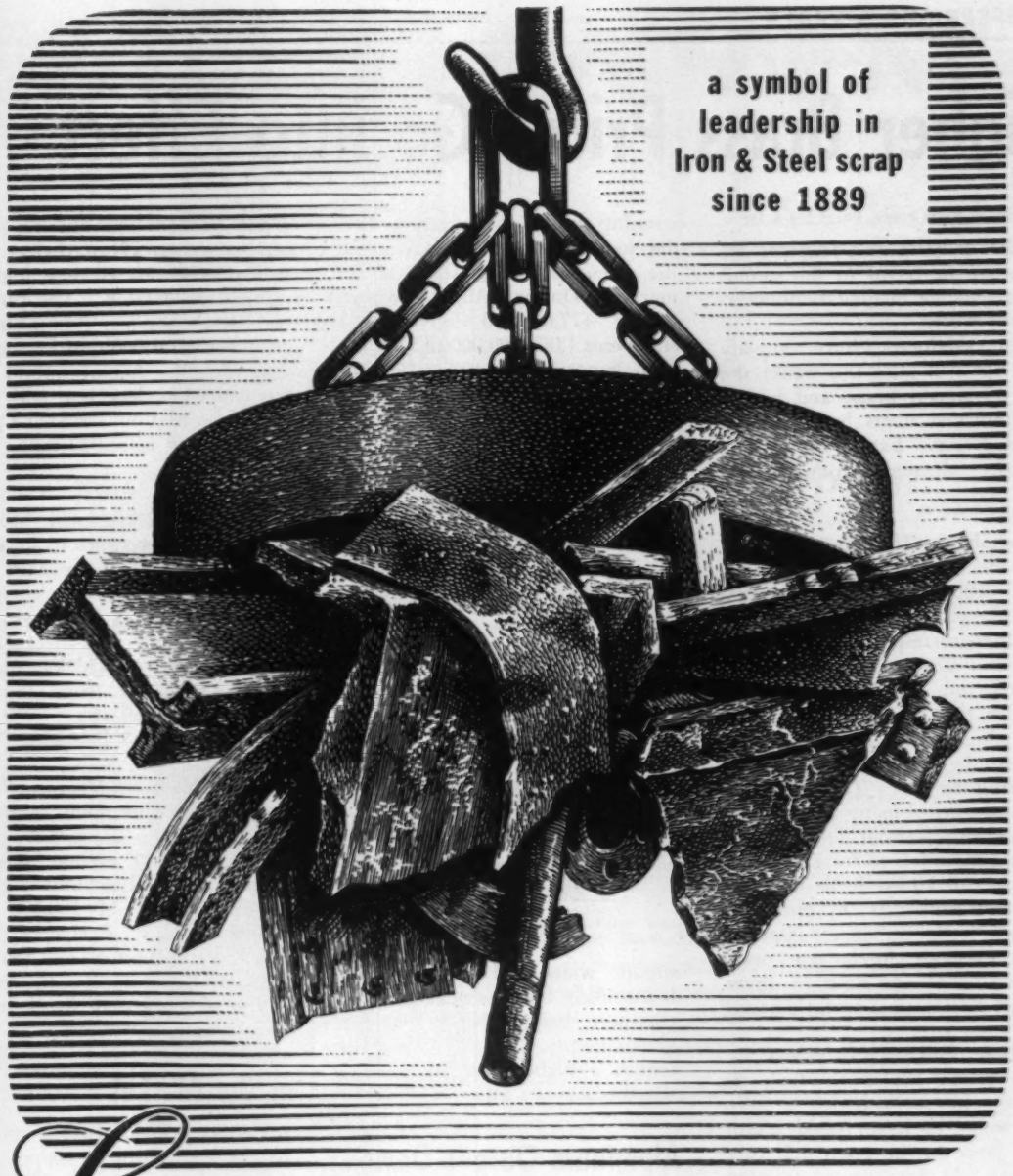
(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

*For export add $4 dock charges.
†Nominal.
‡F.o.b. Hamilton, Ont.



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Higher Brass Prices Go into Effect

Nonferrous Metal Prices, Pages 108 & 109

PRICES of brass mill products are up across the board in the second general change in quotations within three weeks.

Most producers have already hiked (or will later this week) the price of copper, brass, and bronze semifabricated items by 0.25 to 1 cent a pound. Extras are up too. Quantity discounts remain the same.

• **Turnabout**—The action follows hard on the heels of a 3-cent-a-pound drop in the copper price on Oct. 12, which lowered brass mill quotations correspondingly.

Revere Copper & Brass Inc. sparked the move when it announced that higher costs dictated price adjustments. Most mills have been hit by increased labor charges during the year. They have also seen the costs of many supplies and services rising—from lubricants to packing materials to transportation.

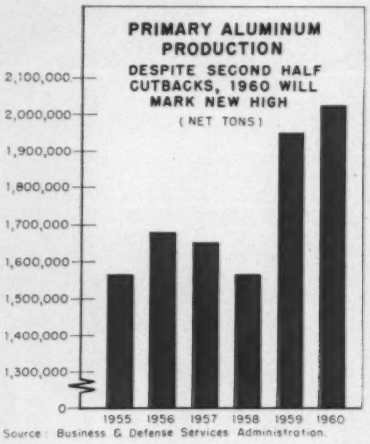
Many metalmen have long felt too much pricing is "by guess and by gosh." Revere's move is an attempt to more closely gear prices to cost, or as one observer states, "to put pricing on a realistic basis."

• **Others Following** — While Revere's action admittedly took the industry by surprise, it's a move that seems to have found unanimous favor in the brass mill community. As STEEL went to press, those mills which hadn't already announced similar action indicated they would probably go along.

• **Effects** — One big unanswered question is how the higher prices will affect imports—the mills' No. 1 problem. One mill executive probably sums up the industry's attitude: "We couldn't be in much more of a disadvantageous position as concerns imports than we have been. At least the increases, if they hold, will allow us to make some profit on our brass and copper product sales."

While imports this year aren't running as high in tonnage as they did in 1959, they're taking about the same percentage share of the market. Through August, imports totaled 117,625,000 lb, domestic shipments 1,062,000,000 lb. In 1959, total imports were 199 million lb, domestic shipments were 1.9 billion lb.

The lower priced imports have intensified competition and the resultant widespread price shading. It's unlikely that the price hike will eliminate shading, but as one metalman quips: "It will at least establish a higher base from which the shading can start."



Source: Business & Defense Services Administration

Aluminum Output Down

Primary aluminum producers have been quietly cutting back production since midsummer to better keep output in line with downgraded sales forecasts. Output hit its high of the year in July when 177,564 tons were produced and has slid off steadily since. In September, reports the Aluminum Association, potlines turned out 162,882 tons, and that's about where production will range over the fourth quarter.

• **Best Year Yet**—In October, the industry has operated at an annual rate of about 1,950,000 tons, some 70,000 tons less than the rate in the early summer. Nevertheless, 1960 will still set an all-time high for primary production. The Business & Defense Services Administration estimates 2,021,000 tons for the year (see chart). Actual output may be somewhat less but still great enough to beat out last year's previous record of 1,953,039 tons.

• **Less Total Supply**—Total domestic availability will still be down, mainly because of fewer ingot imports. BDSA forecasts 1960 imports of 152,500 tons compared with 240,000 tons last year. Secondary recovery will fall to about 442,000 tons vs. 450,000 tons in 1959. Recovery from imported scrap should total about 5000 tons, half of last year's figure.

• **New Aluminum Venture**—Three independent aluminum fabricators and a primary producer have joined to build a $30 million, semicontinuous hot rolling mill with an annual capacity of 100,000 tons. Aluminium Ltd., Bridgeport Brass Co., Scovill Mfg. Co., and Cerro de Pasco Corp. will take the plant's output of reroll stock for their own sheet rolling operations.

In the Market

• **Copper Still Lags**—The recent 3 cent a pound drop in copper prices hasn't aided sales noticeably, which isn't surprising. "A price cut seldom helps demand," says one copper executive, "but it does put our fabricators in a more competitive position with the Europeans."

• **Brass Ingots Lag**—Less business from such major customers as valve producers, pump and compressor manufacturers, and plumbing goods makers, continue to hold back sales of brass and bronze ingots. Through September, shipments reported by the Council of the Ingot Brass & Bronze Industry stood at 182,341 tons compared with 209,677 tons in the like 1959 period.

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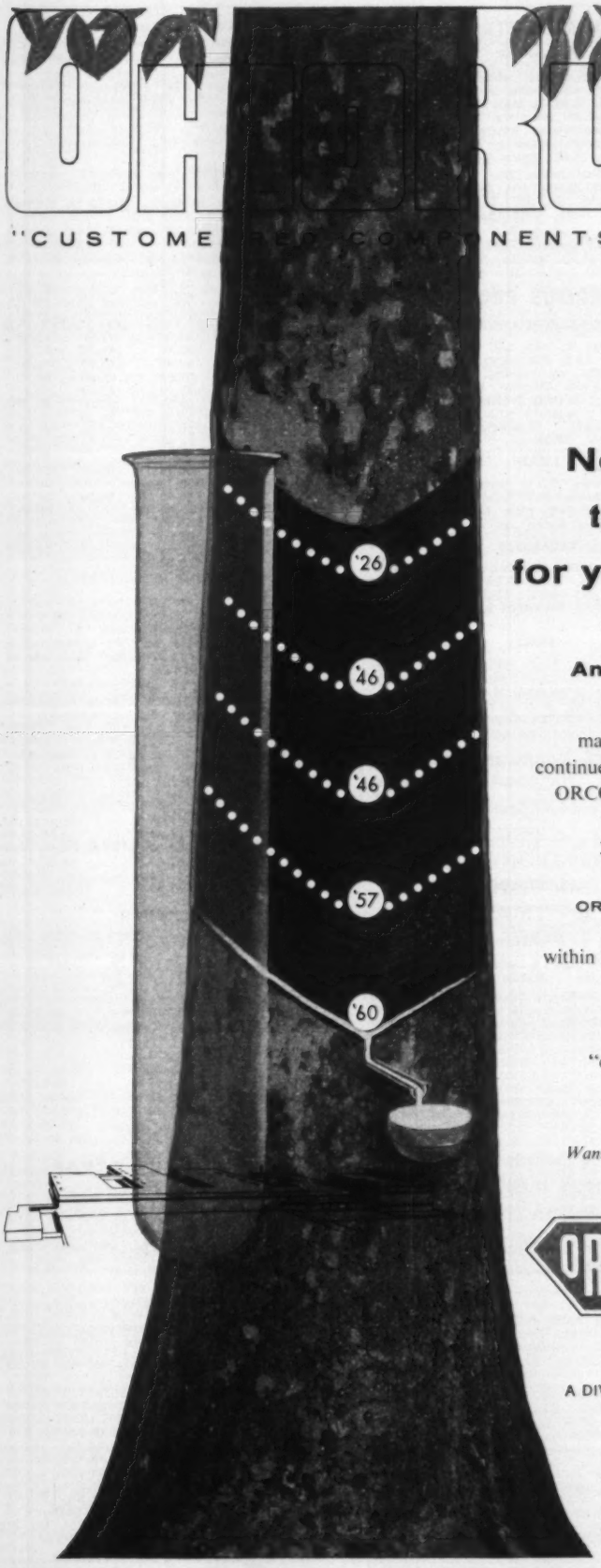

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.50-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 30.00 deld.; custom smelters, 30.00; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-99 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 104.00; prompt, 103.75.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.10.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00. East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb, 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 28.25; tin bronze, No. 225, 38.00; No. 245, 32.50; high-leaded tin bronze, No. 305, 32.75; No. 1 yellow, No. 405, 23.50; manganese bronze, No. 421, 27.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) **Strip,** $1.945, f.o.b. temple, Pa., or Reading, Pa.; rod, bar, wire, $1.945, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 35.35; l.c.l., 35.98. Weatherproof, 20,000-lb lots, 36.30; l.c.l., 37.05.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 22.75-23.25; No. 2 heavy copper and wire, 20.50-21.00; light copper, 18.00-18.50; No. 1 composition red brass, 18.00-18.50; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES e (Based on copper at 30.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.86c	....	55.32	26.000	26.000	25.250
Yellow Brass	48.77	34.38d	49.06	52.43	20.375	19.625	18.625
Low Brass, 80%	51.25	50.94	51.54	54.81	22.500	22.250	21.750
Red Brass, 85%	52.12	51.81	52.41	55.68	23.250	23.000	22.500
Com. Bronze, 90%	53.53	53.22	53.82	56.84	24.000	23.750	23.250
Manganese Bronze	57.27	50.71	61.19	....	19.250	19.000	18.375
Muntz Metal	51.64	46.70	....	....	19.475	19.125	18.625
Naval Brass	53.58	47.14	59.89	57.24	19.125	18.875	18.375
Silicon Bronze	59.96	58.90	59.25	77.89	25.500	25.250	24.500
Nickel Silver, 10%	64.18	66.26	66.26	....	25.125	24.875	12.562
Phos. Bronze, A-5%	74.70	75.45	74.95	76.63	27.125	26.875	25.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.00-17.50; new brass clippings, 15.50-16.00; light brass, 12.50-13.00; heavy yellow brass, 13.50-14.00; new brass rod ends, 14.50-15.00; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 15.50-16.00; brass pipe, 15.50-16.00.

Lead: Soft scrap lead, 7.75-8.00; battery plates, 3.00; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 3.00-3.50; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings 6.00-6.50; segregated low copper clips, 13.00-13.50; segregated high copper clips, 12.00-12.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00; clean borings and turnings, 8.50; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020 in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 23.75; No. 2 heavy copper and wire, 22.25; light copper, 20.00; refinery brass (60% copper) dry copper content, 20.25-20.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.75; No. 2 heavy copper and wire, 22.25; light copper, 20.00; No. 1 composition borings, 19.00; No. 1 composition solids, 19.50; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 16.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.04; oval, 43.50 5000-10,000 lb; electrodeposited, 39.00, 2000-5000 lb lots; cast, 41.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.25; 2000-5900 lb, 13.25; 6000-11,900 lb, 13.00; 12,000-22,900 lb, 12.75; 23,000 lb or more, 12.25.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.

Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

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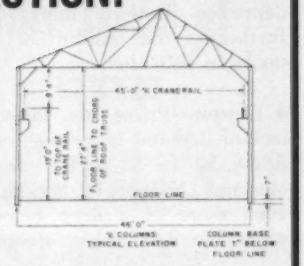

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(*Concluded from Page 103*)
changed, but demand is slow and not much material is moving. No real activity in the market is expected until after the national election.

• **Los Angeles**—Dealers fear some Japanese buyers may attempt to pick up low priced tonnage in the depressed Eastern markets, thus furthering the buildup of surplus stocks in this area.

• **Detroit**—Prices are faltering as lack of demand is forcing auto lists down $2 to $3 a ton on initial closings. Dealers and brokers expect even more of a drop before bids close. No firm orders are out.

Scrap Freight Rates Rise

Interstate freight rates on scrap have been increased 11 cents per gross ton on tariffs up to and including $13 and on tariffs beyond 22 cents per ton. The same rates have also been put into effect in a number of states on intrastate rates.

Distributors . . .

Prices, Page 99

Movement of steel from service centers shows little gain. Some distributors estimate October shipments were down at least 5 per cent from those in September. Their inventories are larger than outgoing shipments warrant.

Undertone of the market is easy with wasters and seconds having an unsettling effect on sheets. In some districts, offerings of foreign steel continue to glut the market and are a threat to price stability.

Pig Iron . . .

Pig Iron Prices, Page 99

Interstate rail freight rates on pig iron have been increased 11 cents a gross ton on tariffs up to and including $13 and 22 cents a ton on tariffs over $13. The increases are effective also on intrastate rates in a number of states. The rail rate on coke has been increased 10 cents a ton.

Foundries continue to operate only three or four days a week and are buying only enough iron to cover needs. Foundries serving the automotive and appliance industries are making slightly larger purchases.

Movement of iron on the Great Lakes remains less than normal for this time of year, but some shippers look for a last minute spurt in the closing weeks of navigation.

Youngstown Sheet & Tube Co. banked its No. 2 blast furnace at the Indiana Harbor (Ind.) Works Oct. 9. The company is studying the possibility of buying Pittsburgh Coke & Chemical Corp.'s long idle blast furnace at Struthers, Ohio.

A major breakout in a blast furnace of the Portsmouth Div., Detroit Steel Corp., Portsmouth, Ohio, may require 30 to 90 days to repair. Cost: $750,000 to $1.5 million.

Canadian Iron and Steel Production Tends Upward

Production of iron and steel in Canada is swinging upward again after declining during the summer months, but it has not attained the high rate that prevailed in 1959. Production of both iron and steel in the first nine months of this year, however, is well ahead of the figures for the corresponding period last year.

Steel output in the latest week of record was 110,747 tons. September production totaled 441,753 tons vs. 424,500 in August, and 491,638 in September, 1959. Output for the first nine months was 4,422,349 tons vs. 4,218,649 in the same period last year.

Pig iron production in September totaled 342,680 tons vs. 328,764 in August, and 362,421 in September, 1959. Output in the first nine months was 3,283,225 tons against 3,096,827 in the like 1959 period.

Rails, Cars . . .

Track Material Prices, Page 97

Freight car orders are light, but September volume was up from August's, totaling 2061 cars vs. 1343, reports the American Railway Car Institute. In September, 1959, orders totaled 943 cars.

September deliveries amounted to 4265 cars compared with 4124 in August this year and 2605 in September last year.

Backlogs as of Oct. 1 showed 11,818 cars on order in railroad shops and 9844 in commercial shops, a total of 21,662. That compares with 23,866 on Sept. 1 this year and 35,626 on Oct. 1, 1959.

Structural Shapes . . .

Structural Shape Prices, Page 94

If forward buying is any indication, structural fabricators aren't anticipating any Dec. 1 increase in prices on structural shapes. Their orders are being held to requirements; most of the larger tonnages are being placed for shipment after Jan. 1.

Demand for structurals is reported firming up in the East where slightly stronger prices on fabricated steel have developed. Some fabricators say backlogs have increased for the first time in weeks. The improvement is reflected in mill bookings, though delivery promises still range two to four weeks.

The seasonal decline in construction and deferment of some construction projects are holding back demand for structurals in the Midwest. Several New England shops have reduced backlogs to the point fabricating cycles are erratic. Work on the Prudential Center, Boston, involving 29,000 tons of steel, has been held up pending an agreement on taxes.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

8500 tons, Lewiston-Queenston arch span bridge over the Niagara River, for Niagara Falls Bridge Commission, Niagara Falls, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, bachelor officers' quarters, military installation, Marshall Islands, South Pacific, to Leckenby Structural Steel Co., Seattle.

456 tons, West High School, Elgin, Ill., for Board of Education, District 46, to Vierling Steel Works, Chicago.

250 tons, Air Force radar towers at various Pacific Northwest locations, to Leckenby Structural Steel Co., Seattle.

105 tons, Associated Grocers' warehouse and office, Colorado Fuel & Iron Corp., Seattle, to Leckenby Structural Steel Co., Seattle.

100 tons, office and warehouse, Clough Equipment Co., Seattle, to Leckenby Structural Steel Co., Seattle; Hugh S. Ferguson Co., Seattle, general contractor.

80 tons, Glaser bottling plant, Seattle, to Leckenby Structural Steel Co., Seattle; Howard S. Wright Construction Co., Seattle, general contractor.

70 tons, warehouse addition, Joseph T. Ryerson & Son Inc., Seattle, to Leckenby Structural Steel Co., Seattle.

STRUCTURAL STEEL PENDING

9418 tons, state bridgework, FIGE 60-3, Kings County, New York; no bids submitted at opening Oct. 20.

3860 tons, Broadway lift span, New York, Slattery Construction Co., New York, low on the general contract.

2963 tons, state bridgework, FARC 60-177, Broome County, New York, Brunalli Contracting Co. of Connecticut is low on the general contract.

2500 tons, joint Oregon-Washington Columbia River toll bridge; preliminary plans in preparation.

2500 tons, state bridgework, Beaver County, Pennsylvania, bids Nov. 18; also, 377 tons of reinforcing bars required.

2216 tons, state bridgework PFC 6607 Niagara County, New York; A. E. Ottavine, Croton, N. Y., is low on the general contract.

1750 tons, municipal hospital, the Bronx, New York; bids Nov. 10.

1028 tons, state bridgework, FINTC 60-2; Stemm Associates, Buffalo, low on the general contract.

1070 tons, state bridgework, FIASE 60-1, Bronx County, New York; bids closed.

1000 tons, Throggs Neck bridge fender construction New York; J. Rich Steers Inc., New York, low bidder on the general contract.

976 tons, state bridgework, FIASE 60-14, Bronx County, New York; Slattery Construction Co. is low on the general contract.

650 tons, Public School No. 304, Brooklyn, N. Y., Caristo Construction Co., Brooklyn, low on the general contract.

650 tons, Public School No. 305, Brooklyn, N. Y., Caristo Construction Co., Brooklyn, low on the general contract.

600 tons, Standard Insurance Co. building, Portland, Oreg.; bids soon.

380 tons, state bridgework, FALIE 60-3, Suffolk County, New York; Lizza & Son low on the general contract.

310 tons, two state bridges, Palmyra, Maine; bids Nov. 9 to Augusta, Maine; also, 138 tons of concrete reinforcing steel.

PLATES . . .

PLATES PLACED

848 tons, high tensile, Grade Hy-80, Navy Purchasing Office, Washington, to Lukens Steel Co., Coatesville, Pa., at $549,507.

500 tons or more, 22,500 ft water supply line, Coquitlam project, Vancouver, B.C.; general contract to Victoria Machinery Depot, Victoria, B.C., low at $396,285, specifying Japanese plate.

250 tons, sheet piling for Biggs Rapid bridge, Columbia River, to U. S. Steel Corp.; Paul Jarvis, Seattle, general contractor.

PLATES PENDING

850 tons or more, 10,085 ft 51 in., welded 5/16 in. plate, Beacon Hill supply line replacement; bids in at Seattle, Oct. 26.

816 tons, steel sheet piling, U. S. Engineer, Louisville, Ky.; bids in; delivery Markland locks and dam, Ohio River, or Madison, Ind.

500 tons, high tensile structural plate, Naval Shipyard, Portsmouth, N. H.; bids Nov. 1; also 287 tons, steel extrusions, high tensile, Grade Hy-80; bids Oct. 31.

500 tons or more, 2.4 mile discharge line, Chief Joseph Dam, Washington State; bids in to the Bureau of Reclamation, Wenatchee, Wash., Oct. 27.

310 tons, 30,000 gallon jet fuel storage tank, pontoon type floating roof, Blytheville, Ark., AFB; bids Nov. 17, U. S. Engineer, Little Rock, Ark.

RAILS, CARS . . .

RAILROAD CARS PLACED

North American Car Corp., seven 70-ton flatcars to General American Transportation Corp., Chicago.

Western Fruit Express, 10 refrigerated semitrailers, manufactured by Brown Trailer Div., Clark Equipment Co. through American Car & Foundry Div., ACF Industries Inc., New York.

Boeing Airplane Co., two, prototype, power generating cars for Air Force ballistic missile trains, to American Car & Foundry Div., ACF Industries Inc., New York.

Union Pacific, 50 seventy-ton covered hoppers to General American Transportation Corp., Chicago.

Seaboard Airline, 25, ninety-ton flatcars, to Thrall Car Mfg. Co., Chicago Heights, Ind.

Atlanta & West Point, 30, fifty ton boxcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Western Railway of Alabama, 20, fifty ton boxcars, to Pullman-Standard Div., Pullman, Inc.

RAILROAD CARS PENDING

Sudan Gezira Board, Barakat, Sudan, 752 cars, bids Nov. 11; list comprises 580 flatcars of nine-ton capacity, three steel and aluminum boxcars of nine tons capacity; 120 all-steel boxcars of nine tons capacity; six 2000-gallon water tankcars; fifteen 2000-gallon oil tankcars; and 28 caboose cars.

Advertising Index

Accurate Gear Works 102
Aetna-Standard Division, Blaw-Knox Co. ..... Inside Front Cover
Alan Wood Steel Co. 112
Amchem Products, Inc. 43
American Brake Shoe Co., Denison Engineering Division 56
American Smelting & Refining Co., Federated Metals Division 57

Bethlehem Steel Co. 1
Blaw-Knox Co., Aetna-Standard Division ..... Inside Front Cover
Bliss, E. W., Co., Mackintosh-Hemphill Division 11
Branson Ultrasonic Corporation 91

Carlson, G. O., Inc. 71
Cleveland Worm & Gear Division, Eaton Manufacturing Co. 28
Colorado Fuel & Iron Corporation, The 26, 27
Cone-Drive Gears Division, Michigan Tool Co. 10
Cutler-Hammer, Inc. 82, 83

Dempster Brothers, Inc. 85
Denison Engineering Division, American Brake Shoe Co. 55

Eagle Picher Co., The, The Ohio Rubber Co. Division 107
Eaton Manufacturing Co., Cleveland Worm & Gear Division 28
Electric Equipment Co. 109
Euclid Crane & Hoist Co., The 102

Federated Metals Division, American Smelting & Refining Co. 57

General Electric Co. 14, 15
Gisholt Machine Co. 23

Hill Acme Co., The, "Canton" Division 102
Hitchiner Manufacturing Co., Inc. 51

International Nickel Co., Inc., The 24
Island Creek Coal Sales Co. 38

Jessop Steel Co. 17

Lukens Steel Co. 48
Lurie Brothers & Co., Inc. 105

McKay Machine Co., Metal Processing Machine Co. Division 60, 61

Mackintosh-Hemphill Division of E. W. Bliss Co. 11
Malleable Castings Council 78, 79
Mesta Machine Co. 73
Metal Processing Machine Co., Division of McKay Machine Co. 60, 61
Michigan Tool Co., Cone-Drive Gears Division 10
Minnesota Mining & Manufacturing Co., Adhesives, Coatings & Sealers Division .. 4

Ohio Crankshaft Co., The 80
Ohio Rubber Co., The, A Division of The Eagle Picher Co. 107
Oilgear Co., The 7
Olin Mathieson, Metals Division 8, 9
Optical Gaging Products, Inc. 37

Pangborn Corporation 12, 13

Republic Steel Corporation 2, 3
Rowe Machinery & Manufacturing Co., Inc. .. 90
Ryerson, Joseph T., & Son, Inc. 18

Sundstrand Corporation 75

Timken Roller Bearing Co., The .....Back Cover

Udylite Corporation, The 52
United States Rubber Co., Mechanical Goods Division 44
Universal Cyclops Steel Corporation 86

Vanadium Corporation of America 47

Wean Engineering Co., Inc., The ..... Inside Back Cover
Wickwire Spencer Steel Division, The Colorado Fuel & Iron Corporation 26, 27
Wyman-Gordon 62

Yawata Iron & Steel Co., Ltd. 88

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Table of Contents
Facing Inside Front Cover

Classified Advertising, Page 109

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See Page 5 Servicenter For Details

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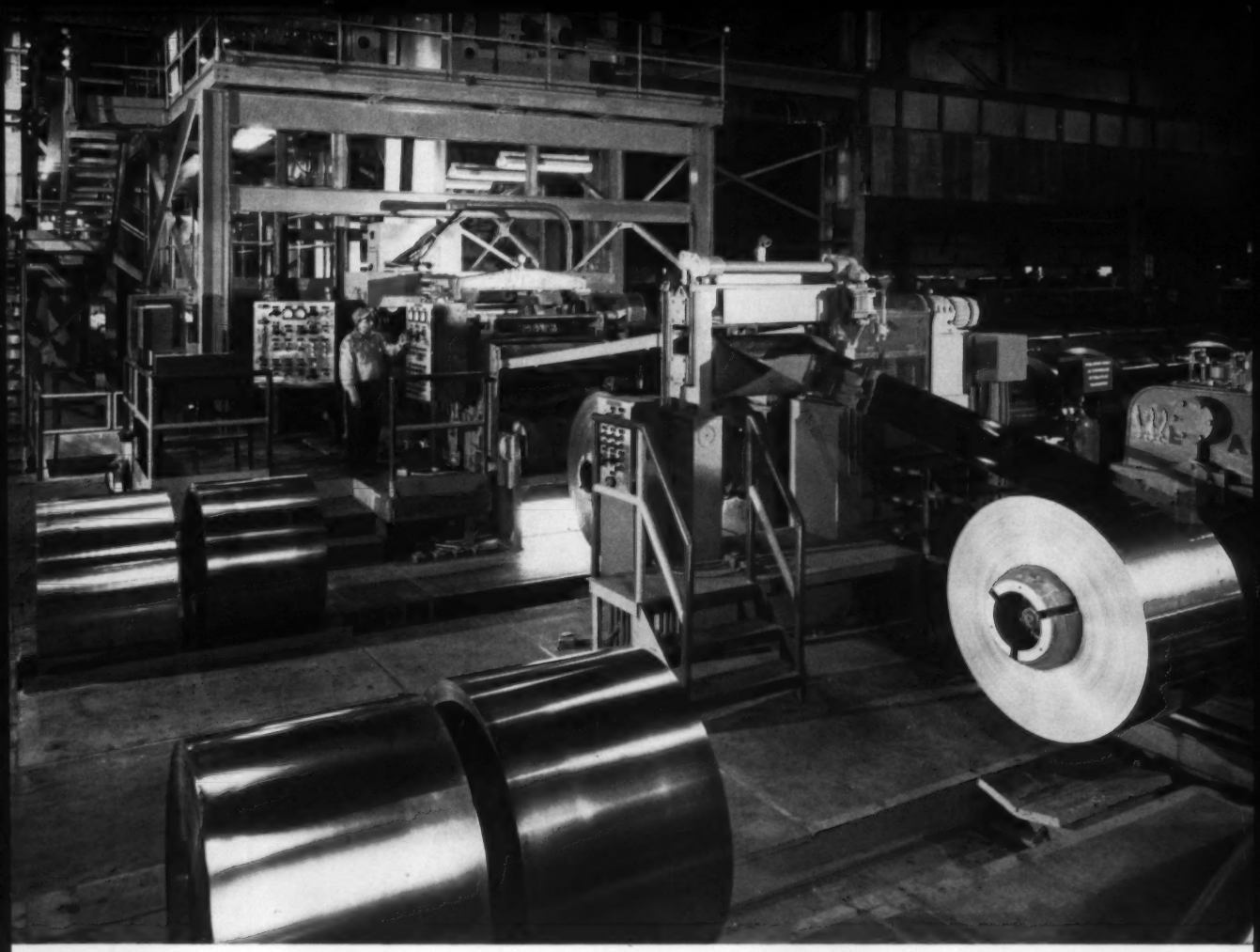

Columbia-Geneva Steel increases tin plate production with third Wean Electrolytic Tinning Line

A third Wean Electrolytic Tinning Line was installed recently by Columbia-Geneva Steel Division of United States Steel Corporation to meet the growing demand for high-quality tin plate on the West Coast. This high-speed "Ferrostan" line incorporates the most modern engineering advances in design and construction of continuous processing lines.

This modern line is among the first to employ an electronic data-logging system to provide a "process profile" of all coiled tin plate. Other new features include improved conductor roll mountings for more rigid support, easily replaced cartridge seals for submerged rolls, and air cylinder-controlled hold-down rolls for faster, more convenient adjustment.

Exit end equipment provides for both recoiling and shearing. A pay-off reel is included to permit shearing and classification of finished coils while the strip being processed is recoiled.

Fifty-one of the world's electrolytic tinning lines carry the Wean name and process over 80% of all electrolytic tin plate produced today. Wean's pioneer experience in continuous processing line equipment has served every major steel firm during the past thirty years. Wean's experience and "creative engineering" stand ready to serve you.

WEAN

THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

Machine tool obsolescence is EVERYBODY'S business

These are the facts:

Machine tool obsolescence in the United States is about 50%.

Some European countries have only 10% machine tool obsolescence.

The tax laws relating to machine tool depreciation in this country are a deterrent to replacing outmoded or worn-out machines.

Every other industrialized nation offers incentives for industry to maintain and upgrade productive capacity.

Here is the result:

With better production facilities, many countries are squeezing us out of world markets; beating us in our own backyard in some instances.

Here is what has to be done:

American industry must be allowed to write off machine tools at a high-enough figure to permit replacing and upgrading *when the need arises.*

Modern depreciation allowances are now being considered that will remove these constrictions—make it easier for American industry to compete in world markets. Keep your employees informed about their stake in keeping American industry strong. More liberal depreciation allowances will mean more jobs and more job security for your employees, and ours, more business, a better chance to compete for your company and ours and greater economic progress for America.

The Timken Roller Bearing Company
Canton 6, Ohio